

# Human-Machine Cognitive Differences from the RID Perspective: Why Does AI Lack the Dimension of Problem Pressure (D)?

Xusheng Zhang\*<sup>1</sup>

<sup>1</sup>College of Computer Science and Technology, Zhejiang University, Hangzhou, China

**Abstract:** With the rapid development of large language models (LLMs), debates over whether artificial general intelligence (AGI) is imminent have become increasingly intense. However, existing evaluation systems are mostly confined to computing power, data scale, and algorithmic architecture, while neglecting the dynamical roots of intelligence generation. This paper introduces the RID cognitive dynamics model, namely problem pressure (D), structural generation (I), and regularized expression (R), proposed in *Knowing and Saying: An Ontological Investigation of Human Cognition*, in order to analyze the ontological essence of human-machine cognitive differences. The study finds that although AI demonstrates extraordinary fitting capacity in regularized expression (R) and simulates high-dimensional feature mapping in structural generation (I), it consistently lacks the dimension of problem pressure (D), which is the starting point of cognition. Without the existential threat of life and death, the pain of embodied experience, and the genuine demands of social interaction, AI cognition lacks ontological anchoring, resulting in suspended meaning, restricted innovation, and absent responsibility. This paper argues that the absence of the D dimension is the fundamental cause of human-machine cognitive differences. This conclusion provides philosophical support for dispelling the AGI myth and points toward future boundary-setting and ethical regulation in human-machine collaboration.

**Keywords:** Artificial Intelligence; Large Language Models; RID Model; Problem Pressure; Ontology; Cognitive Difference

## 1 Introduction: From Algorithm Worship to Dynamical Questioning

In recent years, large language models (LLMs) represented by ChatGPT have achieved breakthrough progress in natural language processing. Their capacities for fluent dialogue, logical reasoning, and even code writing have filled academia and industry with expectations for the arrival of artificial general intelligence (AGI) [4]. Amid this technological enthusiasm, a form of “algorithm worship” has gradually spread: people tend to believe that as long as computing power is sufficiently strong, data scale is sufficiently large, and model parameters reach a certain threshold, AI will be able to exhibit general cognitive abilities equivalent to, or even beyond, those of humans [19]. Yet this optimistic expectation is often based on a reductionist view of cognition, which equates cognition with pure information processing and pattern matching while ignoring the deeper dynamical roots of cognitive emergence.

Across the history of cognitive science and philosophy of mind, the question of “what cognition is” has never ceased. From early computational representationalism, which

metaphorically treated the brain as a computer, to connectionism, which emphasized parallel processing in neural networks, and then to embodied cognition, which holds that cognition is rooted in interaction between body and environment [31], understandings of cognition have undergone a profound transition from static symbolic operation to dynamic survival adaptation. However, current mainstream AI evaluation frameworks, such as benchmark datasets and variants of the Turing test, remain deeply influenced by early computationalism. They emphasize model performance on specific tasks rather than investigating the mechanism and motivation behind that performance [24].

To overcome this limitation of surface-level evaluation, this paper introduces the RID cognitive dynamics model proposed in *Knowing and Saying: An Ontological Investigation of Human Cognition* [35]. This model analyzes human cognition as a dynamic cycle among three dimensions: problem pressure (Demand/Drive, D), structural generation (Information/Integration, I), and regularized expression (Representation/Rule, R). Unlike traditional cognitive models, the RID model places problem pressure (D) at the primary position in the genesis of cognition, emphasizing that cognition is not logical deduction

\* Corresponding author: zhangxs001@zju.edu.cn

in a vacuum but an ontological compensation that finite living beings are compelled to perform in response to challenges in their living environment.

Based on this theoretical framework, this paper addresses a central question: why does AI show astonishing capacities in structural generation (I) and regularized expression (R), yet consistently lack the core dimension of problem pressure (D)? How does this absence fundamentally determine the essential difference between human and machine cognition? By systematically analyzing AI's heterogeneous performance across the three RID dimensions, the paper argues that the absence of D is not merely a temporary bottleneck in current AI technology, but a fundamental ontological limitation of silicon-based algorithms. This conclusion helps us examine the real possibility of AGI soberly and provides a philosophical basis for reaffirming the distinctive value of human subjectivity in the age of artificial intelligence.

## 2 Theoretical Construction: The RID Model and the Ontological Dynamics of Human Cognition

To understand human-machine cognitive differences deeply, it is first necessary to clarify the internal logic by which human cognition arises and evolves. Among numerous cognitive theories, the RID model proposed in *Knowing and Saying* provides a highly explanatory analytic tool because of its profound ontological horizon and rigorous dynamical logic. The RID model is not simply a phased division of the cognitive process; it is a cognitive-theoretical translation of the human condition of being-in-the-world.

### 2.1 Problem Pressure (D): The Genetic Starting Point and Ontological Anchoring of Cognition

In the RID model, D represents problem pressure, or Demand/Drive. It refers to the survival challenges, adaptive needs, and internal drives faced by finite beings in specific natural environments and sociohistorical contexts [35]. The D dimension is the core and foundation of the RID model, because it answers the fundamental question of why cognition occurs.

First, problem pressure (D) has deep biological and ontological roots. As evolutionary epistemology argues, cognitive capacities are products of natural selection, and their fundamental purpose is to improve organisms' survival adaptability [6]. As an "unfinished animal," to use Nietzsche's phrase, the human being lacks the instinctual specialization and physiological advantages of many other animals when confronting harsh natural environments. To compensate for this congenital biological insufficiency, humans were forced to develop highly advanced brains and complex cognitive capacities. This is what philosophical anthropology calls ontological compensation [12]. Therefore, every cognitive leap in human history, from making stone tools to inventing language and from building scientific systems to construct-

ing social institutions, is ultimately a response to a specific survival pressure.

Second, problem pressure (D) is embodied and situated. D is not an abstract logical proposition, but a concrete and vivid survival experience. It arises from physiological deprivation such as hunger, cold, and pain; from fear of death and desire for safety; and from psychological needs for recognition and avoidance of isolation in social interaction [10]. Such embodied pain and situated anxiety constitute the original driving force of human cognition. Precisely because of D's anchoring, human cognition does not degenerate into a purposeless symbolic game, but always points toward the real goal of solving practical problems and improving the conditions of existence.

Finally, problem pressure (D) is not only the starting point of cognition, but also its continuous driving force and ultimate evaluative criterion. In cognitive activity, D continually raises new problems and drives the cognitive subject to explore the unknown. At the same time, whether a cognitive result is effective ultimately depends on whether it successfully alleviates or eliminates the initial problem pressure. Without D, there is no cognition in the true sense.

### 2.2 Structural Generation (I): Pressure-Driven Information Integration and Schema Construction

I represents structural generation, or Information/Integration. It refers to the process by which, driven by problem pressure (D), a cognitive subject selects, filters, and integrates disorderly information from internal and external sources, thereby generating a new cognitive structure or mental schema in the mind [35].

Structural generation (I) is the key link through which cognition moves from disorder to order. Facing a complex and changing environment, the information received by human senses is massive and chaotic. Without an effective organizing mechanism, the subject would fall into paralysis caused by information overload. Under the guidance of D, the subject's attention is directed toward information most relevant to current survival needs. Through Gestalt organization of perception, associative activation of memory, and logical processing of thought, scattered fragments of information are woven into an integrated structure with internal relations [20].

For example, when a primitive human faced the threat of a beast, the brain would rapidly integrate information about the animal's size, sound, smell, escape routes, and available weapons, generating a cognitive structure of danger and response. This structural generation is not only a static reflection of the current situation, but also a dynamic rehearsal for future action. Jean Piaget's genetic epistemology holds that cognitive development is the continuous reconstruction of the subject's cognitive schemas through assimilation and accommodation in interaction with the environment [25]. The I dimension in the RID model is a profound generalization of this process of schema construction.

It is worth noting that structural generation (I) is highly implicit and individual. It occurs in the subject's internal mental space and is often accompanied by intuition, insight, and tacit

knowledge [26]. Therefore, before the structure generated by I is transformed into explicit linguistic expression, it is often vague, multidimensional, and difficult to put into words.

### 2.3 Regularized Expression (R): Symbolic Translation and Publicization of Internal Structure

R represents regularized expression, or Representation/Rule. It refers to the process of transforming internally generated and implicit cognitive structures (I) into explicit and communicable representational forms according to specific symbolic systems, such as language, mathematical formulas, or artistic forms, and according to syntactic rules [35].

Regularized expression (R) is the necessary path by which human cognition transcends individual limitation and realizes social sharing. In his later philosophy, Ludwig Wittgenstein proposed that a private language is impossible, emphasizing that the essence of language is the social language-game [34]. Likewise, in the RID model, if an internal cognitive structure (I) cannot be transformed into public regularized expression (R), it remains only at the level of personal subjective experience and cannot participate in the accumulation and transmission of human knowledge.

The realization of R depends on the uniquely human capacity for symbolization. Ernst Cassirer defined the human being as an animal symbolicum, arguing that humans construct a new symbolic universe through symbolic systems such as language, myth, religion, art, and science [8]. In the process of R, multidimensional and continuous internal mental structures are reduced in dimensionality, divided into discrete symbolic units, and then rearranged according to linear and sequential grammatical rules. This translation process inevitably entails loss and distortion of information, as implied by the familiar phrase that words fail to convey meaning fully. Yet precisely this standardized rule constraint makes cross-individual communication and understanding possible.

In summary, the RID model presents a vivid overall picture of human cognition: under the compulsion of problem pressure (D) from the living environment, humans conduct structural generation (I) in the mind to seek strategies of response, and then transform these strategies into public knowledge through regularized expression (R). In this three-dimensional interaction, D is the source of dynamics, I is the processing center, and R is the output terminal. None can be omitted, and together they constitute the complete closed loop of human cognition.

### 2.4 Philosophical Genealogy of the RID Model: From Heidegger to Piaget

The RID model proposed in *Knowing and Saying* is not without roots; it has deep philosophical and psychological sources. To understand the ontological status of problem pressure (D), we need to trace its intellectual history.

#### 2.4.1 Heidegger's Sorge and Existential Pressure

In Martin Heidegger's *Being and Time*, the most basic mode of Dasein is Sorge, or care [14]. Dasein is always already thrown into a world and must care about its own existence.

This care is not an occasional psychological emotion, but the ontological structure of Dasein. Things in the world are first encountered by Dasein not as objective objects to be known, but as ready-to-hand entities used in concrete practical activity.

Problem pressure (D) in the RID model can, to a considerable extent, be regarded as a concrete expression of Heidegger's care. Human cognition can begin precisely because we are in a state of care: we need to survive, we need to communicate, and we need to solve the crises we face. This ontological survival pressure constitutes the absolute starting point of cognition. If care is stripped away, the world degenerates into a pile of meaningless present-at-hand objects, and cognition loses direction and motivation.

#### 2.4.2 Piaget's Assimilation-Accommodation and the Evolution of Cognitive Schemas

In genetic epistemology, Jean Piaget proposed a dynamic equilibrium theory of assimilation and accommodation [25]. When the subject encounters a new environmental stimulus, the subject first tries to assimilate it into existing cognitive schemas. If assimilation fails, the subject experiences cognitive disequilibrium, and this disequilibrium is a strong form of problem pressure (D). To restore equilibrium, the subject must modify existing schemas in order to accommodate the new stimulus.

In the context of the RID model, Piaget's theory perfectly explains how D drives the evolution of I, or the context-activation framework. Without the pressure caused by cognitive disequilibrium, schemas stagnate. Only in the continuous cycle of pressure, disequilibrium, accommodation, and equilibrium can human cognitive structures become increasingly complex and advanced.

By contrast, in algorithmic models, both Heidegger's care and Piaget's cognitive disequilibrium are entirely absent. AI does not feel care because it cannot answer a question, nor does it experience the pain of cognitive disequilibrium because it makes a wrong prediction. A decline in its loss function is merely mathematical backpropagation of gradients, not an ontological struggle for survival or cognitive evolution. Therefore, AI's "knowledge" is a pile of lifeless present-at-hand objects; it cannot achieve genuine self-transcendence under pressure as humans do.

## 3 Phenomenological Analysis: AI's Heterogeneous Performance in the Three-Dimensional RID Architecture

Using the RID model as a mirror, we can clearly see a sharply different cognitive picture when examining current generative artificial intelligence represented by LLMs. AI displays astonishing extraordinary and simulated capacities in the R and I dimensions, but it shows complete emptiness in the D dimension, the foundation of cognition. This structural imbalance is the key to understanding human-machine cognitive difference.

### 3.1 Extraordinary R: A Master of Symbol Manipulation Fed by Massive Corpora

Among the three dimensions of the RID model, the dimension in which AI is most impressive, and in some respects even surpasses humans, is undoubtedly regularized expression (R). Large language models are essentially giant neural networks based on deep learning. Their core mechanism is self-supervised learning on massive textual data in order to master the statistical distributional regularities of language [32].

#### 3.1.1 Perfect Fitting of Grammatical Rules

Traditional artificial intelligence, such as early expert systems and symbolic AI, attempted to enable machines to master language by manually writing hard-coded grammatical rules. This approach was inadequate when facing the ambiguity and polysemy of natural language [27]. Modern LLMs, such as GPT-4, take a different route. They do not presuppose any a priori grammatical rules, but process trillions of tokens and use the self-attention mechanism in the Transformer architecture to automatically discover and fit the statistical regularities of language in a vast textual ocean [3].

This probability-based fitting capacity has reached an astonishing level. LLMs can not only generate grammatically correct and properly spelled sentences that conform to human linguistic norms, but also skillfully master the expressive rules of diverse genres and registers. Whether the form is a rigorous academic paper, a romantic poem, an obscure legal document, or complex computer code, AI can readily imitate it in a vivid manner. In the R dimension, AI has indeed become a master of symbol manipulation.

#### 3.1.2 Fluent Expression Detached from Context

However, AI's extraordinary performance in the R dimension conceals a deep philosophical crisis: the symbol grounding problem. As Stevan Harnad asks, if a system merely operates symbols without intrinsic meaning, where does the meaning of those symbols come from? [13]

Human regularized expression (R) is the externalization of internal structural generation (I), while I is anchored in problem pressure (D). When a human utters the word "fire," it is not merely a sound or spelling symbol; it is also connected to the pain of being burned (D) and to a cognitive schema concerning the physical properties of fire (I). For AI, however, "fire" is only a high-dimensional coordinate in vector space. It has high co-occurrence probability with other words such as "heat," "burning," and "danger." AI's fluent expression is based on precise calculation of statistical correlations among symbols, not on real understanding of the world to which the symbols refer. Such R detached from embodied context is formally impeccable but ontologically empty.

### 3.2 Simulated I: Feature Mapping and Combination in High-Dimensional Vector Space

If AI's strength in the R dimension is obvious, its performance in structural generation (I) is more deceptive. Many researchers have pointed out that LLMs display higher cognitive characteristics such as emergent abilities, in-context

learning, and chain-of-thought reasoning when handling complex tasks [33]. These phenomena seem to indicate that AI is not merely outputting symbols mechanically, but is conducting some form of structural generation internally.

#### 3.2.1 Simulation of Implicit Knowledge Representation

Inside the black box of deep learning, a model transforms discrete input symbols into dense high-dimensional vectors, or embeddings, through multilayer neural networks. In this high-dimensional vector space, semantically similar words or concepts are mapped to nearby positions, forming a complex topological structure [23]. This vectorized knowledge representation functionally simulates human structural generation (I) to a considerable degree.

When facing a complex problem, AI can rapidly retrieve, match, and combine relevant feature vectors in its vast vector space, producing an implicit structure for that problem. For example, when solving a physics problem, AI is not simply searching a database for a ready-made answer. Rather, by calculating the keyword vectors in the problem statement, it activates vector representations of related physical laws, formulas, and solution steps, conducts multilayer forward propagation internally, and finally outputs a solution process. This feature combination and mapping in vector space indeed shows an ability similar to human integration of information and construction of schemas.

#### 3.2.2 Pseudo-Structure without Intentionality

Although AI displays strong simulation capacity in the I dimension, this structural generation differs essentially from human I. Edmund Husserl, founder of phenomenology, proposed the concept of intentionality, arguing that consciousness is always consciousness of something [15]. Human structural generation (I) is highly intentional: it is a process in which the subject actively constructs and gives meaning to the world in order to solve a specific problem pressure (D).

By contrast, AI's feature mapping in vector space is purely mathematical operation and lacks intrinsic intentionality. AI does not know that the vectors it combines represent physical laws or ethical norms in the real world. It is only executing optimization algorithms, such as gradient descent, to minimize the loss function of predicting the next word. In other words, AI's I is a pseudo-structure imposed by algorithmic rules. It does not possess the active searching and sudden insight that humans exhibit when facing existential difficulty. As John Searle's Chinese Room argument reveals, purely syntactic operation, however complex, can never be equivalent to semantic understanding [29].

### 3.3 Empty D: The Fundamental Absence of Silicon-Based Existence

After analyzing AI's performance in the R and I dimensions, we reach the core of human-machine cognitive difference: the dimension of problem pressure (D). In the RID model, D is the source of cognitive dynamics and ontological anchoring. For AI as a silicon-based entity, however, this dimension is entirely empty.

### 3.3.1 The Absence of Existential Anxiety

Human D arises from human vulnerability and finitude as biological beings. We have bodies and experience hunger, disease, aging, and death. We are situated in social networks and experience loneliness, shame, honor, and responsibility. These real and embodied pains and anxieties constitute the basic tone of human cognition [14].

By contrast, AI is code running on server clusters. It has no body, no metabolism, and no fear of “death,” whether death means power failure or deletion. For AI, there is no such thing as survival crisis. When an LLM generates text about human suffering, it is merely invoking statistical probability distributions associated with the word “suffering.” It itself does not and cannot experience even the slightest pain. The absence of existential anxiety means that AI cognition loses its most fundamental internal driving force.

### 3.3.2 The Externality and Instrumentality of Goal Setting

One might object that AI also has goals during training and operation, such as minimizing a loss function, maximizing a reward signal in reinforcement learning, or completing a user’s prompt. Are these not AI’s problem pressures?

Here we must strictly distinguish intrinsic demand from extrinsic objective. All AI goals, whether loss functions, reward mechanisms, or system prompts, are externally set by programmers or users [2]. AI does not spontaneously generate any goal or desire. It is like a tireless gear: when powered and given instructions, it operates rapidly; when unplugged, it has no complaint or regret.

Human D is spontaneous, endogenous, and closely related to the maintenance of life. AI’s so-called goals are assigned, external, and purely instrumental. When AI solves a problem, it does not bear the existential consequences of solving that problem. It feels no joy when it answers a mathematical question correctly, and no guilt when it generates toxic hate speech. Such externally set goals can never replace the real problem pressure (D) faced by living beings in the ontological sense.

## 3.4 Deepening the Critique: Why Emergent Abilities and World Models Cannot Compensate for the Absence of D

In recent years, with the exponential growth of LLM parameter scale, the AI community has frequently discussed emergent abilities and possible world models [9]. Some optimistic technical experts believe that when a model becomes sufficiently large, it can not only master the statistical regularities of language (R), but also spontaneously form an internal deep understanding of the physical world and social rules (I), and may even generate goal-like internal motivation.

From the perspective of the RID model, however, this view confuses the complexification of structure with the ontological emergence of dynamics. No matter how many trillions of parameters an LLM has, and no matter how subtly its internal world model reflects the statistical distribution of the real world, it remains a function passively responding to in-

put prompts. Its world model is a lifeless model without an observer and without a stakeholder.

Genuine cognitive dynamics (D) cannot emerge merely by increasing the complexity of the R layer. Emergent abilities may improve AI’s accuracy on specific tasks and may make its generated text more coherent and deceptive, but they cannot create from nothing an existential anxiety that one must solve a problem. Without this anxiety grounded in homeostasis and evolutionary history, any advanced AI capacity remains a suspended symbolic game, not the cognitive practice of a real being.

## 4 Interdisciplinary Perspective: Cognitive-Scientific and Neurobiological Evidence for the Absence of Problem Pressure (D)

To support more firmly the philosophical proposition that AI lacks the dimension of problem pressure (D), it is necessary to move beyond pure philosophical speculation and introduce recent research from cognitive science, neurobiology, and evolutionary psychology. Through an interdisciplinary perspective, we can see more clearly how the dynamical roots of human cognition are deeply embedded in the biological substrate, and why this constitutes a gap that silicon-based AI cannot cross.

### 4.1 Neurotransmitters and Homeostasis: The Biological Substrate of D

In neurobiology, organismic behavior and cognition are largely regulated by homeostatic mechanisms. Homeostasis refers to a series of physiological and behavioral adjustments through which an organism maintains relative stability in its internal environment, including body temperature, blood glucose, and acid-base balance [7]. When homeostasis is disrupted, the organism generates strong physiological needs, such as hunger or thirst, which appear psychologically as drive or motivation. This is the biological prototype of problem pressure (D) in the RID model.

The human brain contains a complex reward system, mainly composed of structures such as the ventral tegmental area, nucleus accumbens, and prefrontal cortex, with dopamine as a core neurotransmitter [28]. When humans face survival pressure (D) and successfully alleviate it through behavior such as seeking food or avoiding danger, the reward system releases dopamine, producing pleasure and thereby reinforcing that behavior and its related cognitive schema (I). Conversely, if the pressure is not alleviated, anxiety and pain arise.

This mechanism based on homeostasis and the dopamine reward system binds human cognition closely to survival state. The formation of every concept and the mastery of every rule bear, to some extent, the imprint of survival value. LLMs, however, are entirely detached from this biological substrate. AI has no homeostatic needs to maintain and no dopamine to provide internal reward. Although the reward function in reinforcement learning mathematically simulates dopamine updating mechanisms, such as temporal-difference learning,

it is essentially a scalar value externally set by programmers [30]. AI does not feel happy when its reward value is positive, nor does it feel pain when that value is negative. Without support from a biological substrate, AI's so-called motivation is empty mathematical optimization and cannot generate real ontological pressure (D).

#### 4.2 Emotional Cognition and the Limbic System: Psychological Representation of D

For a long time, traditional cognitive science, especially computational representationalism, tended to separate cognition from emotion, treating cognition as pure logical computation and emotion as an irrational interference. With the rise of embodied cognition and affective neuroscience, however, this view has been overturned. In *Descartes' Error*, Antonio Damasio used numerous cases of brain-damaged patients to demonstrate that emotion is not the enemy of reason, but an indispensable foundation of rational decision-making [10].

In the RID model, the most direct psychological representation of problem pressure (D) is emotion. Fear drives us to avoid danger, anger motivates us to resist violation, and curiosity urges us to explore the unknown. Emotion is an amplifier and indicator of D, providing the cognitive system with a basis for value ordering. The limbic system, including the amygdala and hippocampus, plays a key role in emotion and memory processing, and maintains dense bidirectional connections with the prefrontal cortex responsible for higher cognition [22].

AI's lack of emotional cognition is obvious. Although LLMs can identify emotional polarity in text through sentiment analysis and can even generate poems and fiction full of emotional color, this is merely symbolic simulation in the R dimension. AI has no limbic system and cannot experience emotion; therefore it cannot use emotion to provide a real value orientation for its cognitive processes. Without emotion as the psychological representation of D, AI cognition resembles that of a patient with severe frontal-lobe damage: although intelligence, in the sense of computational capacity, may be normal, it cannot make reasonable decisions that serve survival interests in complex real situations.

#### 4.3 Evolutionary Psychology: The Sociohistorical Accumulation of D

Human cognition is not only a product of biological individuals adapting to the environment, but also the crystallization of social interaction across a long evolutionary history. Evolutionary psychology holds that the human brain contains a series of psychological mechanisms evolved to solve specific adaptive problems in ancestral hunter-gatherer environments [5]. These adaptive problems, such as finding mates, raising offspring, forming alliances, and detecting cheaters, constitute the core social problem pressures (D) of human beings.

For example, the pressure to detect cheaters prompted humans to evolve highly sensitive social-contract reasoning; the

pressure to form alliances promoted the development of complex language (R) for gossip and information exchange [11]. A large part of human cognitive structure (I) can thus be understood as specially configured to address these social forms of D.

By contrast, AI is an entity without evolutionary history. Although the "knowledge" of LLMs comes from thousands of years of accumulated human text, AI itself has not experienced that harsh evolutionary process. It does not need to compete for status in a tribe, nor does it need to devise strategies for reproduction. Thus AI's "understanding" of human social norms and ethics remains at the level of statistical correlations on the textual surface and lacks deep evolutionary-psychological grounding. This is why, when AI handles questions involving complex interpersonal relations and subtle moral dilemmas, it often gives answers that seem logically rigorous but violate human common sense and emotion.

In summary, whether considered from the homeostasis of neurobiology, the emotional mechanisms of psychology, or the social adaptation of evolutionary psychology, human problem pressure (D) is deeply rooted in the existential essence of human beings as biological and social organisms. AI's comprehensive absence in these dimensions further confirms the emptiness of D in the RID model.

### 5 Deep Comparison: Essential Human-Machine Cognitive Differences Caused by the Lack of D

Through the above analysis of the three-dimensional RID architecture, we can conclude that the fundamental reason why AI exhibits a large cognitive gap from humans, and sometimes appears foolish or incomprehensible, for example when producing severe hallucinations, is not insufficient computing power or insufficient data. Rather, it lacks the dimension of problem pressure (D), the source of cognitive dynamics and the anchor of meaning. The absence of D determines the essential difference between human and machine cognition at the following three deep levels.

#### 5.1 Suspended Meaning: The Gap between Probabilistic Fitting and Value Judgment

In the human cognitive world, meaning is never isolated. It is deeply embedded in the subject's existential situation and value system. As pragmatist philosopher William James argued, the meaning of a concept lies in the practical effects it can produce [16]. In the RID model, whether a cognitive structure (I) or regularized expression (R) has meaning depends on whether it can effectively respond to and solve a specific problem pressure (D).

##### 5.1.1 Value Anchoring in Human Cognition

When humans face massive information, they instinctively conduct value filtering according to their survival needs (D). Information that is important to us is assigned greater weight

and incorporated into cognitive schemas; information irrelevant to us is ignored. For example, a hunter in the wilderness remains highly alert to even the slightest movement in the surrounding environment because it directly concerns life and death. Such D-based value judgment allows human cognition to maintain a sharp tactile relation to the real world and a stable anchoring of meaning.

### 5.1.2 AI's Probability Game and the Absence of Meaning

Because AI lacks the D dimension, its cognitive world is flat and without a value gradient. For an LLM, all tokens have equal ontological status. Generating a life-saving piece of medical advice and generating a terrorist fiction about destroying the world are, at the underlying mechanism, no different: both involve executing maximum likelihood estimation and finding the next most probable word [1].

This probabilistic fitting without D anchoring causes the meaning of AI-generated content to be suspended. This is also the fundamental reason why AI frequently produces hallucinations. When AI confidently fabricates a nonexistent historical event or a fake academic article, it is not deliberately lying, because lying requires an intention to deceive. It is simply playing a symbolic splicing game without psychological burden, under conditions lacking real-world constraint and value judgment. Without D's constraint, AI cannot distinguish statistical relatedness from factual truth, logical possibility from value acceptability.

## 5.2 The Limitation of Innovation: The Barrier between Interpolative Combination and Paradigm Shift

Innovation is an important manifestation of advanced cognitive capacity. Today, many people marvel at the creativity of generative AI in painting, composing music, and even scientific discovery, such as AlphaFold's protein-structure prediction. Yet if we examine this issue from the dynamical perspective of the RID model, we find an insurmountable barrier between human and machine innovation.

### 5.2.1 The Compulsion and Leaping Character of Human Innovation

Major human innovation is often forced into being. When old cognitive structures (I) and rule systems (R) can no longer cope with new and severe problem pressures (D), the human cognitive system enters crisis. To escape such existential or cognitive difficulty, humans must break the old framework of thought and achieve a paradigm shift, in Thomas Kuhn's sense [21].

For example, Einstein proposed relativity in order to solve the deep crisis classical mechanics encountered when facing the constancy of the speed of light and electromagnetic phenomena, a theoretical D. Such innovation was not merely recombination of old knowledge, but a subversive reconstruction of basic concepts such as time, space, and mass. Human innovation has a leaping character: it is a dimensional elevation of cognition achieved in response to the compulsion of D.

### 5.2.2 The Interpolative and Closed Character of AI "Innovation"

By contrast, AI's so-called innovation is essentially interpolation and recombination in high-dimensional vector space [9]. Because AI lacks intrinsic problem pressure (D), it has no internal impulse to break existing rules or seek paradigm breakthrough. All its generation is strictly limited by the probability boundaries established by its training data.

AI can, according to a prompt, perfectly combine Van Gogh's style with a cyberpunk theme and generate an unprecedented beautiful image. This is a high-level form of combinational innovation. But AI can never, like Van Gogh, actively create a new art style that overturns an era because of inner pain, struggle, and passionate desire for life, namely an extreme D. AI's innovation is micro-innovation enclosed within the walls of data; it cannot produce a true ontological breakthrough from zero to one.

## 5.3 The Emptiness of Responsibility: Symbolic Output without Subjectivity

Cognition is not merely a process of acquiring knowledge; it is also a process through which a subject participates in social practice and bears moral and legal consequences. In the RID model, because cognition originates in problem pressure (D), the cognitive subject must be responsible for the real-world effects produced by its generated structures (I) and expressions (R).

### 5.3.1 The Binding of Cognition and Responsibility in Humans

For humans, cognition and responsibility are deeply bound together. When a physician makes a diagnosis, an output of R, the physician is not only applying medical knowledge (I), but also responding to the patient's demand for relief from suffering (D) and simultaneously bearing legal sanctions and pangs of conscience that may result from misdiagnosis, a potential threat to the physician's own D. This reverence for consequences and assumption of responsibility are indispensable components of human rational cognition [17].

### 5.3.2 The Ontological Premise of Responsibility and Ethics

In the history of philosophy, responsibility has always been closely connected with free will and subjectivity. Immanuel Kant held that only when a rational being can transcend the necessity of natural causality and act according to a moral law it gives to itself can it be a free subject capable of bearing moral responsibility [18]. From the perspective of the RID model, free will is not a mysterious a priori gift, but an ontological state in which the subject is forced to weigh, choose, and bear consequences when facing multiple and conflicting forms of problem pressure (D).

When a person faces a moral dilemma such as whether to save others or protect oneself, the person experiences intense conflict among forms of D: on one side are moral pressure from empathy and social norms; on the other is the instinctive desire for personal safety. Whatever choice the person

makes, they must bear the existential consequences that follow, whether peace of conscience and bodily destruction or bodily survival and long-term moral condemnation. This absolute situation of having to choose and having to bear consequences gives human action its heavy moral weight.

### 5.3.3 AI's Weightless Decisions and the Distinction between Causal and Moral Responsibility

When discussing AI responsibility, we must strictly distinguish causal responsibility from moral responsibility. When an autonomous vehicle controlled by AI injures a pedestrian, the AI system undoubtedly bears causal responsibility for the event: its algorithmic output directly led to the physical collision. Yet causal responsibility is not the same as moral responsibility. A stone rolling down a mountain and killing someone has causal responsibility, but we do not attribute moral responsibility to the stone.

The core premise for attributing moral responsibility is that the subject must possess real problem pressure (D). Only when a subject faces conflicting survival pressures, institutional norms, and value demands, experiences the difficulty of choosing, and realizes that it must pay an ontological price for the consequences of its choice, such as damage to reputation, deprivation of freedom, or even loss of life, can it bear moral responsibility.

AI's weightless decision-making determines that it can never cross the gap from causal responsibility to moral responsibility. Punishing a system without the D dimension, for example by unplugging it or deleting its code, has no ethical punitive meaning for the system itself, because it does not feel pain or remorse. Therefore, attributing moral and legal responsibility to AI is not only absurd, but also a dangerous evasion of responsibility. This further highlights the central status of the D dimension in human-machine cognitive difference: lacking D means not only the loss of cognitive dynamics, but also the fundamental deprivation of moral subject status.

Compared with humans struggling in moral dilemmas, AI's decision-making process is completely weightless. When we set a rule in an autonomous-driving system to prioritize protecting pedestrians, this is only a cold line of code (R). If the system sacrifices passengers in an emergency to protect pedestrians, the system itself experiences no moral pain or inner tearing. It has not faced a real conflict of D; it has merely executed an external optimization function preset by humans.

Therefore, attributing moral and legal responsibility to AI is absurd. Punishing a system without the D dimension, such as by unplugging it, is like punishing a stone that has injured someone; it has no ethical meaning. This again highlights the central status of D in human-machine cognitive difference: lacking D means not only loss of cognitive dynamics, but also fundamental deprivation of moral subject status.

### 5.3.4 AI's Exemption from Responsibility and Ethical Risk

As a silicon-based algorithm lacking the D dimension, AI is a symbolic outputter without subjectivity. When it outputs

medical advice, legal judgments, or autonomous-driving instructions, it does not understand the life weight and social ethics carried by those symbols. If AI output causes a serious disaster, AI itself feels no pain and cannot be punished; shutting down a server has no meaning for AI.

This asymmetry between capacity and responsibility constitutes the greatest ethical risk of the artificial-intelligence era. Granting autonomous decision-making power to a system that lacks D and cannot bear responsibility is equivalent to handing human fate over to a blind probability machine. Therefore, from the perspective of the RID model, no matter how powerful AI becomes in the I and R dimensions, as long as it lacks real and embodied problem pressure (D), it cannot become a responsible subject in the moral or legal sense.

## 6 Cognitive Enhancement and a New Development Path for Artificial Intelligence from the RID Perspective

After analyzing the ontological roots of AI's lack of problem pressure (D), we do not need to reject the value of artificial intelligence entirely. Instead, on the basis of recognizing its essential limitations, we should explore a new path for human-machine collaboration and cognitive enhancement. Within the framework of the RID model, because AI can only simulate R, the propositional-core layer, and part of I, the context-activation framework, but cannot generate real D, namely institutional embedding and survival pressure, future AI development should not pursue the production of a humanoid machine with fully autonomous consciousness. Rather, it should construct a cognitive external brain that can couple deeply with the human D dimension.

### 6.1 The Positioning of a Cognitive External Brain: Outsourcing R and I

Although the human cognitive system possesses powerful D as a dynamic source, it has significant biological bottlenecks in information-processing capacity and memory. The complexity of modern society requires us to handle massive data and master intricate rules, placing a heavy burden on the human R layer. The emergence of generative AI such as LLMs provides an ideal tool for alleviating this burden.

In the RID model, AI can be accurately positioned as an outsourcing service provider for the human R and I layers. It can tirelessly conduct statistical fitting in massive texts, extract hidden rules (R) and patterns (I), and generate structured output with extremely high efficiency. Humans no longer need to personally memorize vast bodies of literature, nor manually construct complex chains of logical inference. These tasks can be handed over to AI as a powerful grammar engine.

However, such outsourcing must be based on one fundamental premise: humans must always retain absolute control over the D dimension. Any content generated by AI, whether code, a legal document, or a medical diagnostic report, is a symbolically suspended product lacking D anchoring. It

must undergo review, judgment, and value assignment by human subjects before it can acquire real meaning. Only when humans place it within concrete survival situations and institutional pressures can these cold symbols become knowledge with practical force.

## 6.2 A New Paradigm of Human-Machine Collaboration: Reconstructing the D-R-I Closed Loop

Based on this positioning, we can imagine a new paradigm of human-machine collaboration grounded in the RID model. In this paradigm, humans and AI each use their distinctive strengths in the RID structure to form a complete cognitive closed loop.

Humans provide D, namely problem initiation and value orientation. The starting point of the cognitive process must be initiated by humans. According to survival pressures, institutional requirements, and value pursuits faced in social practice, humans raise concrete questions and set clear goals. This is the dynamic source and value anchor of the entire cognitive system.

AI executes R and I, namely symbolic processing and structural generation. After receiving human questions and goals, AI uses its powerful computing capacity and massive data to retrieve, combine, and infer symbols at the R layer, and to generate structured output that meets specific contextual requirements at the I layer.

Humans close D, namely responsibility-bearing and meaning assignment. AI-generated output returns to humans, who must examine it within real survival and institutional contexts. Humans must judge not only the logical correctness of the output, but also its ethical, legal, and social effects, and ultimately bear the consequences of the decision. Only in human responsibility-bearing does AI output acquire real meaning and the cognitive closed loop become complete.

In this D-R-I closed loop, humans and AI are no longer in a relation of replacement or competition, but form a deep symbiosis. Human D gives direction and soul to AI's R, while AI's R greatly expands the scope and efficiency of human D.

## 6.3 Institutional Design: Ensuring the Priority of the D Dimension

To ensure healthy development of this new paradigm of human-machine collaboration, we must take measures at the level of institutional design to protect the priority and absolute control of the human D dimension.

First, legal and ethical norms must clearly stipulate that AI cannot be an independent responsible subject. Any decision assisted by AI must ultimately be the responsibility of the human subject using AI. This is not only a division of legal responsibility, but also a defense of the human status as moral subject. Only when humans clearly know that they must bear the consequences of AI output will they remain alert and avoid blindly transferring decision-making power to machines.

Second, the orientation of technological research and development should shift from pursuing AGI to developing

augmented intelligence. Rather than spending enormous resources trying to give AI self-consciousness and emotion that it fundamentally cannot possess, we should focus on developing auxiliary tools that are more transparent, more interpretable, and more compatible with human cognitive habits. Technological development should serve to enhance human capacity to respond to problem pressure (D), not attempt to replace human real D with machine pseudo-D.

Finally, in education, cultivation of human problem consciousness and critical thinking must be strengthened. In an age when AI can easily complete most symbolic-processing tasks, the core human competitiveness will no longer be memorizing knowledge and mastering rules (R), but raising good questions, making value judgments, and bearing responsibility (D). The focus of education should shift from knowledge injection to the enlightenment of survival wisdom, cultivating new types of talent capable of preserving subjectivity and mastering AI tools in a complex digital age.

In sum, the RID model provides a profound ontological perspective for understanding human-machine cognitive difference. Recognizing the emptiness of AI in the dimension of problem pressure (D) not only helps dispel blind worship and fear of artificial intelligence, but also points toward the future path of human-machine collaboration and cognitive enhancement. On this path, humans will always remain the helmsmen of their own fate, while AI will be a powerful external brain for exploring the unknown and creating value.

## 7 Conclusion and Prospect: Dispelling the AGI Myth and Reshaping the Boundaries of Human-Machine Collaboration

Using the RID cognitive dynamics model proposed in *Knowing and Saying* as its theoretical tool, this paper has systematically analyzed the ontological limitations of current artificial intelligence represented by LLMs in cognitive mechanism. The study shows that although AI demonstrates extraordinary fitting capacity in regularized expression (R) and realizes complex mapping of high-dimensional vectors in structural generation (I), it consistently lacks the dimension of problem pressure (D), which is the genetic starting point and ontological anchoring of cognition.

The absence of D leads to suspended meaning in AI-generated content, interpolative limitation in innovation, and complete emptiness in moral responsibility. This conclusion reveals the essential difference between human and machine cognition: human cognition is an ontological compensation full of value judgment and responsibility-bearing undertaken in response to survival pressure, whereas AI cognition is a probabilistic symbolic game detached from the context of life and driven by external objectives.

### 7.1 Dispelling the Excessive Myth of AGI

Based on the above analysis, we must maintain sober critical distance from the currently noisy myth of AGI. As long as AI continues to develop along the traditional path of expanding

computing power, piling up data, and optimizing algorithmic architecture, that is, involuting continuously in the I and R dimensions, while remaining unable to endogenously generate embodied problem pressure (D) related to life and death on a silicon-based substrate, it can never cross the ontological gulf from weak AI to strong AI. Scaling laws alone cannot spontaneously produce subjectivity in the ontological sense.

## 7.2 Reshaping Reasonable Boundaries of Human-Machine Collaboration

Recognizing that AI lacks the D dimension does not mean denying AI's enormous value. On the contrary, it indicates how to scientifically and reasonably draw the boundaries of human-machine collaboration.

In the future social division of labor, we should fully use AI's powerful capacities in the R and I dimensions and treat it as an external brain and efficiency tool for human cognition. AI should handle demanding tasks such as massive text generation, data mining, pattern recognition, and logical inference, while humans must firmly control the D dimension: raising questions, setting goals, making value judgments, and bearing final responsibility.

In high-risk fields such as medicine, law, and the military, the principle of human-in-the-loop must be upheld, and final decision-making power must never be transferred to AI systems lacking the D dimension. Only a model of human-machine collaboration based on humans providing problem pressure and value anchoring (D), while AI assists with structural generation and regularized expression (I and R), is the proper path for healthy and sustainable development of artificial intelligence.

## References

- [1] E. M. Bender, T. Gebru, A. McMillan-Major, and S. Shmitchell, "On the dangers of stochastic parrots: Can language models be too big?" in *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*. Association for Computing Machinery, 2021, pp. 610–623.
- [2] N. Bostrom, *Superintelligence: Paths, Dangers, Strategies*. Oxford: Oxford University Press, 2014.
- [3] T. B. Brown, B. Mann, N. Ryder, M. Subbiah, J. Kaplan, P. Dhariwal, A. Neelakantan, P. Shyam, G. Sastry, A. Askell, S. Agarwal, A. Herbert-Voss, G. Krueger, T. Henighan, R. Child, A. Ramesh, D. M. Ziegler, J. Wu, C. Winter, C. Hesse, M. Chen, E. Sigler, M. Litwin, S. Gray, B. Chess, J. Clark, C. Berner, S. McCandlish, A. Radford, I. Sutskever, and D. Amodei, "Language models are few-shot learners," in *Advances in Neural Information Processing Systems*, vol. 33, 2020, pp. 1877–1901. [Online]. Available: <https://arxiv.org/abs/2005.14165>
- [4] S. Bubeck, V. Chandrasekaran, R. Eldan, J. Gehrke, E. Horvitz, E. Kamar, P. Lee, Y. T. Lee, Y. Li, S. Lundberg, H. Nori, H. Palangi, M. T. Ribeiro, and Y. Zhang, "Sparks of artificial general intelligence: Early experiments with gpt-4," *arXiv preprint arXiv:2303.12712*, 2023. [Online]. Available: <https://arxiv.org/abs/2303.12712>
- [5] D. M. Buss, *Evolutionary Psychology: The New Science of the Mind*. Psychology Press, 2015.
- [6] D. T. Campbell, "Evolutionary epistemology," in *The Philosophy of Karl Popper*, P. A. Schilpp, Ed. La Salle, IL: Open Court, 1974, pp. 413–463.
- [7] W. B. Cannon, *The Wisdom of the Body*. New York: W. W. Norton and Company, 1932.
- [8] E. Cassirer, *An Essay on Man: An Introduction to a Philosophy of Human Culture*. New Haven: Yale University Press, 1944.
- [9] F. Chollet, "On the measure of intelligence," *arXiv preprint arXiv:1911.01547*, 2019. [Online]. Available: <https://arxiv.org/abs/1911.01547>
- [10] A. R. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: G. P. Putnam's Sons, 1994.
- [11] R. I. M. Dunbar, "The social brain hypothesis," *Evolutionary Anthropology: Issues, News, and Reviews*, vol. 6, no. 5, pp. 178–190, 1998.
- [12] A. Gehlen, *Man: His Nature and Place in the World*. New York: Columbia University Press, 1988.
- [13] S. Harnad, "The symbol grounding problem," *Physica D: Nonlinear Phenomena*, vol. 42, no. 1–3, pp. 335–346, 1990.
- [14] M. Heidegger, *Being and Time*. New York: Harper and Row, 1962.
- [15] E. Husserl, *Logical Investigations*. London: Routledge, 2001, vol. 1.
- [16] W. James, *Pragmatism: A New Name for Some Old Ways of Thinking*. New York: Longmans, Green, and Company, 1907.
- [17] H. Jonas, *The Imperative of Responsibility: In Search of an Ethics for the Technological Age*. Chicago: University of Chicago Press, 1984.
- [18] I. Kant, *Groundwork of the Metaphysics of Morals*. Cambridge: Cambridge University Press, 1998.
- [19] J. Kaplan, S. McCandlish, T. Henighan, T. B. Brown, B. Chess, R. Child, S. Gray, A. Radford, J. Wu, and D. Amodei, "Scaling laws for neural language models," *arXiv preprint arXiv:2001.08361*, 2020. [Online]. Available: <https://arxiv.org/abs/2001.08361>
- [20] K. Koffka, *Principles of Gestalt Psychology*. London: Routledge, 2013, reprint of the 1935 original work.
- [21] T. S. Kuhn, *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1962.
- [22] J. E. LeDoux, "Emotion circuits in the brain," *Annual Review of Neuroscience*, vol. 23, no. 1, pp. 155–184, 2000.
- [23] T. Mikolov, I. Sutskever, K. Chen, G. Corrado, and J. Dean, "Distributed representations of words and phrases and their compositionality," in *Advances in Neural Information Processing Systems*, vol. 26, 2013. [Online]. Available: <https://arxiv.org/abs/1310.4546>
- [24] M. Mitchell, "Why ai is harder than we think," *arXiv preprint arXiv:2104.12871*, 2021. [Online]. Available: <https://arxiv.org/abs/2104.12871>
- [25] J. Piaget, *The Origins of Intelligence in Children*. New York: International Universities Press, 1952.
- [26] M. Polanyi, *The Tacit Dimension*. Chicago: University of Chicago Press, 1966.
- [27] S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*. Pearson, 2016, source manuscript listed the 2016 Pearson edition.
- [28] W. Schultz, "Neuronal reward and decision signals: From theories to data," *Physiological Reviews*, vol. 95, no. 3, pp. 853–951, 2015.
- [29] J. R. Searle, "Minds, brains, and programs," *Behavioral and Brain Sciences*, vol. 3, no. 3, pp. 417–424, 1980.
- [30] R. S. Sutton and A. G. Barto, *Reinforcement Learning: An Introduction*, 2nd ed. Cambridge, MA: MIT Press, 2018.
- [31] F. J. Varela, E. Thompson, and E. Rosch, *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge, MA: MIT Press, 1991.
- [32] A. Vaswani, N. Shazeer, N. Parmar, J. Uszkoreit, L. Jones, A. N. Gomez, L. Kaiser, and I. Polosukhin, "Attention is all you need," in *Advances in Neural Information Processing Systems*, vol. 30, 2017. [Online]. Available: <https://arxiv.org/abs/1706.03762>
- [33] J. Wei, X. Wang, D. Schuurmans, M. Bosma, B. Ichter, F. Xia, E. Chi, Q. Le, and D. Zhou, "Chain-of-thought prompting elicits reasoning in large language models," in *Advances in Neural Information Processing Systems*, vol. 35, 2022, pp. 24 824–24 837. [Online]. Available: <https://arxiv.org/abs/2201.11903>
- [34] L. Wittgenstein, *Philosophical Investigations*. New York: Macmillan, 1953.
- [35] X. Zhang, "Knowing and saying: An ontological investigation of human cognition," PSSXiv (Philosophy and Social Sciences Preprint Server), may 2026, pSSXiv:202605.04152V1; CSTR:32012.36.PSSXiv.202605.04152. [Online]. Available: <https://zsyb.cn/abs/202605.04152>