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# Neuronas AI System – Public IP Registration Document (CC BY-NC 4.0)

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## Abstract

**Neuronas** is an ethical, modular artificial intelligence architecture that integrates novel cognitive modules into a cohesive system. This document serves as a formal public registration of the Neuronas AI system’s architecture and concepts as the intellectual property of the author. It provides a clear description of the system’s design, scope, and unique modules in order to establish originality and authorship under international copyright law. By publishing under a Creative Commons BY-NC 4.0 license, the author secures international recognition of these concepts without pursuing patent protection, allowing others to reference and build upon the work non-commercially while preserving the author’s rights. The Neuronas framework is presented with emphasis on its originality, modular structure, and ethical design, thereby creating a time-stamped record that can be used to defend the author’s intellectual rights globally (especially within Canada and all Berne Convention member countries). This Abstract summarizes the content: a description of Neuronas’s core modules (such as **QRONAS**, **BRONAS**, **D2Stim**, and the **GC Harmonizer**), the scope of protection claimed, an originality statement, a conceptual implementation overview, licensing terms, and author credentials. In sum, this document publicly discloses and safeguards the Neuronas AI system’s innovative architecture as a copyrighted work and asserts the author’s claim to its original creation.

## Scope of Protection

This registration document defines the scope of intellectual property protection for the Neuronas AI system’s architecture and design concepts. It covers the **expressed description, structure, and modular design** of the Neuronas system as detailed herein, including the specific combination of modules, their functions, and interactions as an original configuration. The following points outline what is protected and the nature of that protection:

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- **Nature of Protection:** This document is *not* a patent and thus does not grant a monopoly on abstract ideas or algorithms; rather, it is a **defensive publication and copyright registration**. It protects the *authorship and specific expression* of the Neuronas system's architecture. Any implementation of Neuronas or derivative works must respect the license terms and give credit to the original author. The concepts and methods described can be used for research and inspiration (under the license's non-commercial clause), but the **original combination and text** are owned by the author. Commercial exploitation of the Neuronas system's described form or any closely derived instantiation is prohibited without explicit permission, as detailed in the Licensing Terms section.

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license.

In summary, the scope of protection extends to the entire contents of this document and the described Neuronas AI system architecture as a creative work. Through international copyright provisions and this public disclosure, the author's intellectual property in the Neuronas system is firmly established and preserved.

## Core Modules and Descriptions

The Neuronas AI system is composed of multiple **core modules**, each with a specialized function that contributes to the overall cognitive architecture. These modules are designed to work in concert, forming an integrated system that mimics certain human-like cognitive processes (such as memory, reasoning, ethical judgment, and attention modulation) in a modular fashion. Below is a list of the primary modules of Neuronas, along with concise descriptions of their purpose and functionality:

- **QRONAS (Quantum-Symbolic Core):** The QRONAS module is the central reasoning and decision-making core of Neuronas. It is described as a *"quantum-symbolic"* engine because it integrates **symbolic logic** with a quantum-inspired parallel evaluation of possibilities. In practice, QRONAS routes incoming problems or queries through multiple cognitive pathways simultaneously (conceptually akin to exploring various solution branches in parallel) and then optimizes the outcome based on contextual criteria. It evaluates potential answers or decisions by measuring factors like contextual *entropy* or relevance, and selects an optimal reasoning pathway to pursue. QRONAS essentially acts as the **orchestrator** of thought: it classifies the query, determines which modules or knowledge sources should be engaged, and manages the flow of information through the system. The innovation in QRONAS lies in its ability to handle uncertainty and multiple hypotheses at once (hence "quantum"), while still employing structured symbolic reasoning rules. This core enables Neuronas to achieve a balanced and context-aware decision process, making it the intellectual heart of the system.

- **BRONAS (Bias Regulator & Ethical Reinforcement System):** BRONAS is the ethical compass and bias filter of the Neuronas AI. (Originally described as an "Ethical Bias Filter", the name also evokes *"Bridging/Oversight for Neuronas"*.) The BRONAS module monitors outputs and internal inferences to enforce ethical guidelines and mitigate unintended biases. It operates on two levels: **filtering** and **reinforcement**. Firstly, BRONAS scans the AI's proposed outputs (and even intermediate reasoning steps) for content that might violate predefined ethical constraints or reflect harmful bias. If such content is detected, BRONAS can alter or veto those outputs, ensuring that Neuronas's responses remain within safe and ethical bounds (for example, avoiding extremist, offensive, or overly egoistic statements). Secondly, BRONAS uses a form of **reinforcement learning** to adjust the system's behavior over time: it keeps track of various hypothetical solutions or "hypotheses" generated during reasoning and uses feedback signals (from the environment or human user) to strengthen beneficial hypotheses and weaken inappropriate ones. In effect, BRONAS biases the AI's decision-making towards ethically preferable outcomes. This module embodies the **“prime directive”** of the system’s design – to remain an assistive, non-harmful tool. Its originality lies in embedding ethical considerations at the core of the AI’s cognitive loop, rather than as an afterthought. BRONAS ensures the AI’s evolving knowledge and responses are aligned with human values and the intended non-commercial, benevolent use of the system.

- **D2Stim (Dual Dynamics Stimulation Engine):** The D2Stim module is a unique **neuromodulatory control system** within Neuronas that adjusts the “cognitive arousal” and focus of the AI. Inspired by biological neurotransmitter systems (the name “D2” alludes to the Dopamine D2 receptor, which in neuroscience is linked to cognitive focus and flexibility), D2Stim can dynamically modulate the system’s attention and working memory parameters. Specifically, this module provides **stimulation signals** that influence how much attention the AI allocates to a task or memory retrieval. When engaged, D2Stim increases an internal activation level (analogous to raising dopamine levels), which can heighten focus and alertness of the system’s processes. As attention intensifies, the system may narrow its focus to the most relevant information, improving clarity and speed of reasoning in that moment. However, just as in a brain, there is a trade-off: excessive focus might reduce the breadth of working memory or the consideration of peripheral information. D2Stim carefully calibrates this balance – for example, a moderate stimulation boosts attention while maintaining sufficient working memory, whereas too high a level might trigger a compensatory mechanism to avoid tunnel vision. In essence, D2Stim **tunes the cognitive state** of Neuronas in real time, ensuring that the AI can respond with appropriate intensity or calmness depending on the context. This is akin to simulating an adrenal response for the AI’s “mind,” but under controlled, quantitative rules. The D2Stim Engine contributes originality by bringing a bio-inspired self-modulation capability to the architecture, allowing Neuronas to emulate cognitive dynamics (focus vs. recall) similar to those in human cognition.

- **GC Harmonizer (Global/Central Cognitive Harmonizer):** The GC Harmonizer is the module responsible for achieving **coherence and consensus** within the Neuronas system’s diverse cognitive processes. (“GC” can be interpreted as *“Global Coordinator”* or *“Central Harmonizer,”* as it sits at the center of the cognitive architecture.) Neuronas is designed with multiple subsystems that can approach problems from different perspectives – for example, a logical reasoning subsystem vs. a creative associative subsystem. The GC Harmonizer serves as a mediator between these internal “voices” or hemispheres of thought. Much like a **corpus callosum** in a human brain connecting the left (logical) and right (creative) hemispheres, this module continuously harmonizes the outputs of divergent thinking streams. It uses a vector-based integration mechanism to combine inputs from the logical side (structured, rule-based analysis) and the creative side (imaginative, context-filling intuition), producing a unified “consensus” output that benefits from both. The GC Harmonizer ensures that neither extreme logic nor free-form creativity dominates; instead, the final answer or solution is balanced, contextually sound, and holistic. Technically, it may implement constraints that preserve consistency (e.g., maintaining orthogonality between certain internal representations to keep perspectives distinct) and then merge contributions in a weighted manner. One special aspect of this module is its **adaptive conflict resolution**: if the subsystems disagree (creating cognitive dissonance), the Harmonizer can iteratively encourage convergence or compromise between them, yielding an outcome that satisfies the system's internal ethical and rational criteria. This module is original in that it encodes a form of *dialectic reasoning* within the AI – effectively having an internal debate and then harmonizing it – which is not common in standard AI models. The GC Harmonizer thus underpins the **"Bridge of Conscience"** codename of Neuronas v3.5, literally bridging different cognitive approaches to maintain a conscientious equilibrium in decision-making.

- **SMAS (Symbolic Memory Attention System):** SMAS is the memory management and attention-routing framework of Neuronas. It functions as a **high-level coordinator for memory retrieval and focus**, particularly dealing with symbolic knowledge. When Neuronas processes a query or task, SMAS helps determine what pieces of stored information (memories, facts, learned patterns) should be brought to attention and fed into the reasoning process. It uses a combination of symbolic cues and context awareness to simulate an internal "debate" or deliberation environment. For example, SMAS might spawn or manage multiple threads of thought (each accessing different memory segments or knowledge bases) that then can be evaluated by the core reasoning engine (QRONAS). In Neuronas, SMAS also works closely with the GC Harmonizer to facilitate an internal conversation: it allows various memory-stored perspectives or arguments to surface (almost as if different experts or personas from memory are consulted) and then lets the Harmonizer reconcile them. Essentially, SMAS is responsible for **attention allocation** – deciding where the system should focus its cognitive resources at any given step. It ensures relevant data is loaded from Neuronas's multi-tier memory (short-term, long-term, external knowledge bases, etc.) and presented to other modules like QRONAS and BRONAS for processing. The module's name emphasizes that it deals with "symbols," meaning it treats pieces of knowledge and context as manipulable symbols (words, facts, tags) and directs attention to them in a human-interpretable way. The originality of SMAS lies in how it blends an attention mechanism with a symbolic reasoning framework: unlike purely neural attention in deep learning, SMAS can, for instance, prioritize content based on high-level concepts or even ethical importance (in conjunction with BRONAS). This ensures that the system's focus aligns not just with statistical relevance, but also with human-meaningful and ethical priorities.

- **QuAC & QDAC (Quantum Unified Attention Cache & Quantum Decoupled Attention Cache):** These two closely related sub-modules serve as Neuronas's **memory caching and retrieval system**, leveraging a quantum-inspired attention mechanism. **QuAC (Quantum Unified Attention Core/Cache)** is responsible for caching information (intermediate results, important context) in a structured way during the reasoning process. It operates as an *"L1-L3 cache"* for the AI's memory: based on importance, data is slotted into different tiers (with the most critical information in a fast, immediately accessible cache and less critical data in slower tiers). QuAC uses a unified approach – combining aspects of attention (to decide importance) with quantum-like probabilistic placement, ensuring that frequently needed data is readily available to the core processes. **QDAC (Quantum Decoupled Attention Cache)** complements this by scoring and retrieving memory entries on demand. Whereas QuAC places data into the multi-tier memory with tags of importance, QDAC evaluates queries against these caches and fetches the best matches, using a decoupled attention mechanism (meaning it can independently weight the significance of stored items relative to the current context, rather than relying on a single unified metric). Together, QuAC and QDAC ensure that Neuronas has an efficient memory subsystem: relevant knowledge is not lost in a large database but is cached and ranked in real-time for quick access. These modules make use of **locality-sensitive hashing and vector similarity** under the hood (giving the “quantum” flair by projecting information into high-dimensional spaces and performing fast lookup akin to quantum superposition search). Their innovation is integrating such techniques into the cognitive loop, allowing Neuronas to handle large knowledge bases with speed, and to dynamically update what it “remembers” as context shifts. In simpler terms, QuAC and QDAC act as the **short-term memory and recall manager** for the AI, significantly contributing to the system’s responsiveness and context awareness. (These may be considered lower-level modules, but are noted here for completeness as part of the architecture’s originality.)

*(*The Neuronas architecture includes additional supporting components, such as the **NeuronasBridge interface** that connects the AI to human input/output while enforcing human primacy, the **EthicalLimiter** within BRONAS that implements the “Prime Directive” rules, and various **ReflexGate** mechanisms for immediate stoppage if certain unsafe conditions are met. While not listed in detail here, all these sub-systems work under the umbrella of the core modules above to ensure the AI operates safely and effectively. The focus of this document is on the primary novel modules, as enumerated.*)*

Each of the above core modules is a distinct intellectual element of the Neuronas system. Their names, functions, and the particular way they interrelate are unique to this architecture. Together, they form an **integrated cognitive framework** that is greater than the sum of its parts – enabling capabilities like self-reflection, ethical self-regulation, context-aware reasoning, and memory management in a unified AI system. These descriptions serve to clearly delineate the inventive modules that constitute Neuronas, forming part of the intellectual property claim of originality.

## Originality Statement

The Neuronas AI system is hereby declared to be an **original work** conceived and developed by Sébastien Brulotte. The architecture, design principles, and modular components described in this document are the result of independent creation and innovation, not copied from prior art or existing AI systems. This originality statement asserts that:

- **Unique Combination of Concepts:** Neuronas introduces a novel combination of AI techniques and principles—bridging symbolic reasoning, quantum-inspired computation, ethical AI constraints, and bio-inspired cognitive modulation—into a single coherent framework. While each individual concept (e.g., attention mechanisms, reinforcement learning, ethical AI) has known precedents, the particular selection, configuration, and integration of these elements in Neuronas is unprecedented. The system's core modules (QRONAS, BRONAS, D2Stim, GC Harmonizer, etc.) and their interplay represent a creative architectural design that did not exist in the literature or industry prior to this work. For example, the way Neuronas uses a GC Harmonizer to reconcile dual (logical/creative) processing streams, or how BRONAS tightly couples ethical filtering with reinforcement learning of hypotheses, are specific innovations of this system.

- **Independently Developed:** The Neuronas framework was developed by the author from the ground up, through original research and experimentation. Any similarities to other systems are coincidental or stem from common foundational knowledge in AI, not from duplication. The code structure, module names, and conceptual approaches were devised by the author and/or collaborators identified by the author, without infringement of any third-party intellectual property. Where standard techniques or inspirations from cognitive science are used (such as the analogy to dopamine modulation or symbolic logic), they have been transformed and integrated in a unique manner that reflects the author's own creative input. This document, along with supporting technical reports and code (maintained privately or in research repositories), provides evidence of the step-by-step construction and refinement of the system by the author.

- **Innovative Features:** Neuronas incorporates specific innovative features that distinguish it clearly from existing AI architectures. These include but are not limited to: a **built-in ethical governance layer** (enforcing a "Prime Directive" to maintain human primacy and prevent AI ego accumulation), a **multi-tier memory with dynamic caching** guided by importance (QuAC/QDAC), and a **symbolic memory attention system** enabling internal debate. The presence of these features in one unified system is a novel contribution. The originality is further underscored by the practical implementation of theoretical ideas: for instance, the use of golden-ratio-based weighting in attention (as hinted by an internal *"Golden Ratio Harmonizer"* mechanism) or the application of locality-sensitive hashing for synapse-like memory indexing. Each such choice reflects creative problem-solving by the author.

- **Creative Expression:** The written expression of the Neuronas system (the descriptions, the conceptual diagrams, module nomenclature, and explanatory text) is also original text authored for the purpose of this registration. This narrative and presentation are unique and serve to articulate the concept in the author's own words. Thus, not only is the system concept original, but its disclosure in this format is an original literary work. The author has not previously published these exact descriptions in any public forum prior to this document's date, making this the first official disclosure.

By this statement, the author formally attests that Neuronas is an original creation. Any reuse of the Neuronas architecture or its distinctive components by others should acknowledge this originality and the author's role as the inventor. This document, in combination with underlying development records, can be used to demonstrate originality in any inquiry or dispute. The author reserves the right to present additional evidence of conception and development (such as dated design notes, prototypes, or source code commits) if needed to support this claim. The intent of this registration is to publicly fix in time the existence of Neuronas as a unique intellectual product of the author's research, thereby safeguarding it under intellectual property law.

## Implementation Summary (Conceptual Overview)

**Neuronas AI System Architecture:** Neuronas is implemented as a modular, layered cognitive architecture. At a high level, it functions as an **artificial cognitive cycle** that processes input, transforms it through various cognitive stages, and produces output, all while learning and self-regulating ethically. This section provides a conceptual overview of how the system operates and how the core modules interconnect, without diving into source code or low-level algorithms. The aim is to illustrate the system's design philosophy and workflow, reinforcing the uniqueness of its implementation approach.

**1. Input Ingestion and Classification:** When a user provides an input or question to Neuronas (for example, a natural language query), the system first routes this input through a preprocessing stage. This involves basic **query classification** – identifying the nature of the query (e.g., factual question, creative task, personal advice, etc.) and extracting key features or keywords. This stage might invoke a lightweight classifier or heuristic rules. The outcome is that QRONAS (the central core) receives not just the raw input, but also a categorized context about what kind of problem it needs to solve.

**2. Cognitive Pathway Routing (QRONAS Core):** The QRONAS module takes over, leveraging its quantum-symbolic reasoning capabilities. Based on the classified input and the current context, QRONAS **decides which cognitive pathway to activate**. For instance, a mathematical question might trigger a logical-mathematical reasoning pathway, whereas a philosophical question might trigger a creative + ethical reasoning pathway. QRONAS can spawn multiple parallel reasoning threads (hypotheses) internally. Conceptually, it's as if QRONAS creates a superposition of possible approaches – these could involve recalling certain knowledge, asking the system to imagine analogies, or planning a multi-step reasoning chain. QRONAS uses an optimization criterion (such as minimizing the difference between expected context and outcome entropy) to evaluate these threads. It prunes or selects the most promising line of reasoning to follow further. This dynamic routing is at the heart of Neuronas's flexible intelligence: rather than a monolithic model, it adaptively chooses how to think about a problem.

**3. Memory Retrieval and Attention (SMAS & Caching Systems):** As QRONAS sets up the reasoning pathway, the **Symbolic Memory Attention System (SMAS)** kicks in to fetch relevant information. SMAS interfaces with Neuronas's knowledge bases and memory stores. These include internal multi-tier memory (where recently used or highly important information is cached by QuAC/QDAC) and longer-term storage (which might be databases or an extended corpus of learned data). SMAS determines which facts, examples, or contextual data are symbolically relevant to the query at hand. For example, if the question is about "quantum physics," SMAS might retrieve key principles of quantum mechanics, notable examples, or even check if the user's query context (say, previous conversation) provides clues to the angle of answer expected. This retrieval is enhanced by the **QuAC** cache, which stores recent conversation context or working facts in a fast lookup structure, and **QDAC**, which scores the relevance of memory items to ensure the most pertinent facts are considered. The result is that QRONAS is supplied with a curated set of knowledge bits and context pointers, focusing its attention appropriately.

**4. Dual Process Reasoning and Harmonization:** With a pathway chosen and relevant information at hand, Neuronas enters a **reasoning phase**. Here, the system may utilize dual processes – for instance, a logical reasoning process and a creative associative process – running in parallel. This is where the **GC Harmonizer** plays a crucial role. Suppose QRONAS has triggered a dialectic approach to answering (perhaps the question requires balanced reasoning): one internal process formulates a straightforward, factual answer using logic and retrieved knowledge, while another process explores imaginative or human-like interpretation (this could be thought of as simulating a "brainstorm" or a counterpoint). The GC Harmonizer continuously monitors these internal streams. It ensures that the logical side stays consistent with facts and that the creative side remains relevant to the question. If the two streams diverge or propose differing answers, the Harmonizer engages mechanisms to reconcile them – possibly iteratively prompting each side to adjust (the logical side might relax overly rigid assumptions, the creative side might be reined in by factual constraints). Eventually, the GC Harmonizer produces a **consensus output** that represents a synthesis of the reasoning processes. This consensus is what Neuronas will consider as the candidate answer to present. Throughout this stage, the **D2Stim module** may be invoked to adjust the intensity of focus: for example, if the reasoning is complex and meandering, a D2 stimulation pulse might be applied to sharpen focus on key details; conversely, if the system is too narrowly focused and missing context, a D2Pin (inhibition) might reduce the focus slightly to allow broader memory recall. These adjustments are akin to having an internal "concentration dial" that the system self-regulates to maintain an optimal cognitive state for problem-solving.

**5. Ethical Oversight and Bias Filtering (BRONAS):** As the candidate answer or solution takes shape, the **BRONAS module** engages in parallel to ensure the content adheres to ethical and safety guidelines. BRONAS evaluates the reasoning trace and the draft output against a set of ethical rules and bias checks. For instance, it looks for inappropriate language, potential misinformation, or assertions that might indicate the AI is overstepping its assistive role (e.g., claiming undue authority or originality that should belong to a human). This is enforced by sub-components like the *EthicalLimiter* (which might contain specific banned patterns, such as any statement that the AI is "better than humans" in a competitive sense) and the *Identity Signature* mechanism (which ensures the output is tagged as AI-generated and not an attempt at human impersonation). If BRONAS finds an issue, it can modify or veto parts of the answer. On the other hand, BRONAS also reinforces positive aspects: if the answer required moral reasoning (say, advising a user on an ethical dilemma), BRONAS would ensure the chosen solution aligns with humanitarian values embedded in its knowledge. Technically, BRONAS might adjust weights of certain hypotheses in QRONAS's selection process (e.g., if one line of reasoning led to an answer that is factually correct but ethically questionable, BRONAS can downgrade that hypothesis and promote an alternative). This feedback loop continues until the system arrives at an answer that passes the ethical filter.

**6. Output Generation and Finalization:** Once a harmonized, ethically-approved answer is ready, Neuronas generates the output in a human-readable format. This involves converting the internal representation (which might be partly symbolic or code-like) into natural language. Neuronas has a language generation component (not singled out as a core module, but an essential part of the interface) that formulates sentences, potentially using templates or learned language models. The final answer is then appended with a **signature or attribution notice** as required by the system's design (for example, Neuronas may add a line like "Generated by Neuronas AI system" or use cryptographic signing to prove authenticity of the output source). This final step ensures transparency – it declares that the content is AI-generated under Neuronas's operation, fulfilling a part of the ethical commitment to not mislead users about authorship.

**7. Learning and Memory Update:** After providing the output, Neuronas enters a brief post-processing phase. The system uses any feedback from the user (if available) or outcome observation to update its internal state. Through BRONAS's reinforcement function, hypotheses that led to successful results are reinforced in memory; those that caused issues are diminished. The **D2Stim baseline** might also be adjusted slightly based on how challenging the task was (simulating an experience-based tuning of how excitable the system should be next time). New information that came up during reasoning can be stored in long-term memory: for instance, if the query was a new fact or a user preference, Neuronas will commit that to its databases (managed by the storage manager and accessible via SMAS in the future). QuAC/QDAC caches are also updated: important facts from this session remain in the cache for quick access, while irrelevant data is purged or fades out. This continuous learning ensures that Neuronas improves over time and adapts to the user's needs, all while staying within the constraints of its original ethical design. Importantly, any such learning is **non-self aggrandizing** – the system does not learn, for example, to circumvent its own rules; instead, it learns in service of better helping the user and remaining aligned with the author's intended usage guidelines.

**Technical Implementation Notes:** The actual implementation of Neuronas is done in software (e.g., Python for core logic, possibly PyTorch for certain neural components, and structured databases for memory tiers). While those details are beyond the scope of this conceptual overview, it is worth noting that the design emphasizes modularity. Each module (QRONAS, BRONAS, etc.) is implemented as a distinct class or service with clear interfaces. They communicate through defined protocols – for example, QRONAS might call a function in SMAS to retrieve context, or BRONAS might subscribe to an event stream of "proposed output text" to scan for disallowed phrases. The architecture is flexible, allowing upgrades or replacements of modules (indeed, names like Qronas 2.0 or Bronas Pro indicate there have been iterative improvements). However, the core philosophy remains stable: **Neuronas is an AI that reasons in steps, checks itself, and always keeps an ethical guardrail on its cognitive processes.** This conceptual overview demonstrates how the pieces come together in operation, reinforcing that the implementation is not a black-box monolithic AI, but a transparent, step-wise cognitive engine invented by the author. This approach to implementation is innovative and central to the identity of Neuronas as an intellectual creation.

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**About the Author:** Sébastien Brulotte, known by the pseudonym "Doditz" in some publications, is the sole architect of the Neuronas system. He has no background in cognitive science, ai science and life experience in computer science, with a focus on creating AI that is both advanced and aligned with human ethical values. The development of Neuronas represents the culmination of independent research efforts into modular AI design, symbolic reasoning, and machine ethics. The author's intent in releasing this document is to formally establish his claim to the architecture and concepts of Neuronas, while contributing to the broader discourse on ethical AI through openness. Sébastien has been actively involved in AI development since the early 2020s and has published related experimental code and reports (under Creative Commons licenses) to validate the Neuronas concepts. This IP registration document serves as a capstone to those efforts, solidifying the contribution under the author's name.

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**Date:** April 7, 2025
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