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Cerebral Networks

Rethinking Neural Networks

Summary

This document presents abstract solutions for mimicking neural switching mechanisms and explains a design concept for developing artificial intelligence. It is based on the principles of the human brain and describes how neural structures like axons and neurons can be simulated and optimized through technical models. Growth and decay processes (neurogenesis), various interaction types, and transistor-like behaviors are detailed to enable precise control of neural impulses. Special attention is given to mimicking transmitter-receptor interactions and near-field effects, where electromagnetic fields influence adjacent neurons and promote new connections. Practical applications, such as the model of an artificial intelligent life form (KID) that merely feeds and rests like a unicellular organism, illustrate the theoretical concepts. The aim of this document is to present innovative approaches to AI development by integrating biological principles and technical models and to foster scientific collaboration.

Status of this Memo: DRAFT

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Chapter 1: Project Foundation

1.1 Background

The motivation for this project arose from a spontaneous inspiration revealing a potential solution to a complex problem in neural networks. As a visionary with an unfinished diploma and without a formal academic degree, I developed this idea over years into a comprehensive concept. With a long lead time for developing and refining a coherent and mature concept, I wish to present this work as a Request for Comments (RFC).

1.2 Project Goals

The main goals of this project are:

- Presentation of a novel model for describing neural signal transmissions.
- Analysis and design of network dynamics considering various neuron types.
- Presentation as a Request for Comments to introduce it to a broader expert audience and accelerate further development.

1.3 Innovation Approach

This project is an abstract virtual solution for the problem of neural interactions and information processing in the brain. The underlying neurogenesis concept and the interactions of neurons were the source of further innovations, contributing to a coherent and functioning work.

1.4 Development and Milestones

1.4.1 Conceptualization and Idea Generation

1.4.1.1 Principles of Information Processing

- Automatic aggregation of information through the neurogenesis principle.
- Information is aggregated from signals in impulse form, where each impression is linked as associative information with others. Axons form immediately between closely adjacent active neurons, and at multiple neurons, axon nodes become neurons.
- Macroscopic consideration of processes to simplify results instead of detailed calculations.

1.4.1.2 Dynamics and Influence

- Internal influence of neurons: Neurons influence each other and propagate their properties through the network. The rule that output transmitters are transmitted equally to input transmitters leads to a propagation of transmitter types through the network. With good structural planning, a self-regulating and information flow-controlling behavior is automatically created.

- Plasticity of the spatio-temporal network: This plasticity is necessary for transmitter logic in neurons. It automatically positions newly formed neurons precisely linked to adjacent information through neurogenesis.

1.4.1.3 Structure and Connection

- Delimitation and connection of independent information: Independent information can be logically separated or purposefully connected depending on structural design. Independent information can also define independent and interacting transmitters or groups of transmitters among themselves.

1.4.1.4 Approaches and Compatibility

- Different approaches to circuitry: Through the new esoteric appearing circuitry, neural networks become cerebral networks, meaning that known and new concepts represent very different approaches.
- Compatibility and convertibility of methods: Both methods can be converted into each other. Compared to classical neural networks, the necessary plasticity can only be calculated more complexly with classical networks. A simulation is ultimately more complex than direct implementation.

1.4.1.5 Learning Ability and Applications

- Computational effort and learning ability: The higher computational effort is due to the plasticity, which represents a more complex model. The advantages arise from increased learning ability. An emotional skeleton and a subconscious can also be created with this. The possibilities of creating an emotionally feeling life form with self-learning ability are impressive.

Conclusion

These rich concepts and innovations will be clarified in the following chapters.

1.4.2 Presentation and Feedback

- Preparation of the RFC documentation: Creating the RFC documentation for the formal presentation of the concepts.
- Presentation of the concept: Presentation of the concept and collection of feedback from the scientific community.

1.4.3 Summary and Outlook

The project foundation establishes the basis for a new model of neural networks - cerebral networks. Combining intuition and structured methods creates innovative solutions that go beyond traditional approaches. The following chapters will provide detailed explanations and technical descriptions of various aspects of the model.

Chapter 2: Main Concepts

2.1 Key Concepts in this Work

2.1.1 Fundamental Principles

- Neurogenesis: The process of growth and development of new neurons and axons.
- Evolution from a primordial seed or superseed: The idea that neural networks evolve from a primordial seed is a central tenet of the project. This concept forms the basis for developing complex networks that self-organize and adapt.
- Representation as a spatio-temporal network (STN): STNs are a model that describes the spatial and temporal interactions of neural elements.
- Spherical neurons for transmitter and receptor behavior: Neurons are modeled as spherical structures with various transmitters and receptors on their surfaces. These transmitters significantly influence how information is transmitted and processed.

2.1.2 Growth and Decay

- Concepts for axon and neuron growth: New axons and neurons grow and integrate into the existing network, which is crucial for structural adaptability and repair of networks after damage. Technical models enable the simulation and optimization of these growth processes.
- Concepts for axon and neuron decay: Just as growth must be regulated, there are mechanisms that control the degradation of axons and neurons. These processes are necessary to remove damaged or redundant structures and make room for new connections.

2.1.3 Information Processing and Plasticity

- Aggregated and interwoven information automatically: The network can automatically aggregate and interweave information by forming new connections based on the interactions between active neurons. This promotes efficient information processing and adaptation to new environments.
- Exclusively with electrical potentials for impulses: Information transmission in these cerebral networks occurs exclusively through electrical potentials conducted as impulses through the axons. These impulses are crucial for activating neurons and forming new connections.

2.1.4 Structural and Functional Properties

- Independent areas through shielding membranes: The model proposes separating independent areas of the network through shielding membranes to minimize interference and ensure efficient information processing.
- Threshold resistance and transformation of impulses in neurons: Neurons can exhibit transistor-like behavior by controlling impulse flow through specific

transmitter/receptor pairings. These mechanisms allow precise control of neuronal activity.

- Diverse polarization effects: The polarization effects of different transmitters in neurons are crucial for switching behaviors and information processing. These effects enable complex interactions and precise control of impulses in the neural network.
- Eight different basic interaction types in neurons: Interactions between neurons can be categorized into eight basic types, including redirection, additive behavior, subtractive behavior, throughput threshold, mirroring, aggregation, and quantification. These interactions determine how information is processed and transmitted.
- Independent information types through transmitter type definitions: Different transmitter types allow distinguishing and processing different types of information within the network. This leads to more specialized and precise information processing.
- Differential formation thanks to polarized transmitters: The polarization of transmitters enables differential formation and processing of information in the neural network. This enhances the adaptability and flexibility of the system.

2.1.5 Advanced Concepts and Theorems

- Electromagnetic fields for near-field effects: Electromagnetic fields generated by active neurons play a key role in the interaction of neurons over short distances. These effects influence the formation of new axons and the networking of neurons.
- Interactions of active (charged) neurons with each other: Active neurons containing electrical impulses generate electromagnetic fields that promote the formation of new axons and networking with adjacent neurons. These interactions are crucial for the dynamic adaptation and plasticity of the neural network.
- Oligopolistic and transmorphic structures: These structures automatically grow within the network based on the neurogenesis principle and considering the two fundamental theorems.
- Oligopolistic development of neurons: Neurons can develop into oligopolistic structures where multiple transmitter types are present simultaneously. These complex neurons enable diverse and flexible information processing.
- Pain and damage formation in the cerebral structure: The model also considers the possibility of structural damage caused by extremely high electrical impulses. These effects can lead to structural changes and adaptations within the network.
- Concepts for super-neurons (merging many neurons): Super-neurons result from the merging of multiple neurons and offer enhanced capabilities and higher performance. These structures can undertake more complex information processing tasks and contribute to the robust functioning of the network.

2.1.6 Summary Theorems

- Fundamental Theorems: The theorems provide solutions to questions about the manner of interactions and information processing. The two questions that needed solving were:
    - How do neurons control impulses?
    - How does neurogenesis, the formation of neurons and axons, work? These theorems are also the triggering reason for starting this project.

2.2 Recapitulation of the Author's Concepts

This chapter presented the key concepts. Based on the richness of various key concepts, the reader can understand the complexity of this work. Although it is a very complex and evolved work that started from just two fundamental theorems, everything has fit together like a puzzle until the end. If this new construct regarding cerebral networks had developed less logically and consistently, I would have given up long ago. I am convinced that this new way of thinking will find its followers. I am also convinced that it will gradually become clear to more and more people how beneficial the two fundamental theorems can be, with continued consistency, and how conveniently the concept of neurogenesis can develop itself purposefully.

2.3 Summary

This chapter introduced 20 key concepts from 6 categories. These concepts include the developments that have flowed into this work.

Chapter 3: The 2 Fundamental Theorems

3.1 Historical Origin

This chapter explains the historical development of the fundamental ideas and the two fundamental theorems forming the theoretical basis of the project.

3.2 Prerequisite of this Idea

- Impulses in neurons activate them.
- If a neuron contains at least one impulse, it is considered active.
- Only active neurons emit an EM field.
- Closely adjacent and simultaneously active neurons generate new axons connecting them. They also influence each other in choosing further paths of impulses within the spatio-temporal network (STN). The distance for generating connection axons is considered limited for simplicity.

3.3 The 2 Fundamental Theorems

- EM Near Field + Cerebrospinal Fluid: Neurons connect with new axons in various forms.
- Receptor and Neurotransmitter Logic: Impulses branch through mutual influence according to defined cases.

3.4 Summary

Chapter 3 explains the historical development of the fundamental ideas and the two fundamental theorems forming the theoretical basis of the project.

Chapter 4: Example of an Auto-Actor Model

4.1 Introduction of the Example

This example concerns the simplest form of existence of an artificial intelligent life form (KID). This can either feed or sleep and is driven by hunger and satiety signals.

4.2 The AI's Own Development Process

4.2.1 Description of the Development Process

1. A simple signal transport initiated by the hunger sensor. Continuous impulses are directed through the A1 axon to the feeding action.
2. A conditional signal transport initiated by the satiety sensor. Under the condition of satiety, impulses are directed along the A2 axon to the sleeping action.
3. On A1, there is a neuron named A1-N1-Type A, and in close proximity on A2, a neuron named A2-N2-Type B.
4. The continuous hunger signal leads to feeding, and the conditional satiety signal leads to sleeping.
5. Hunger and satiety both send signals.
6. If impulses (signals) simultaneously affect neurons A1-N1-Type A and A2-N2-Type B, a connecting axon "A to B redirection" is formed.
7. The impulses in A1-N1-Type A are conditionally redirected to A2-N2-Type B through "A to B redirection". The redirection is conditional on the simultaneous occurrence of the satiety signal, causing continuous hunger to lead to sleep as long as satiety is achieved.
8. If satiety is no longer given, continuous hunger prevails until the life form is sated and begins to sleep again.

4.2.2 Justification of the Development Process

The behavior of the KID corresponds to the first two fundamental theorems, which cause the following behavior:

Main Theorem 1

- The 1st main theorem leads to the connection of A1-N1-Type A and A2-N1-Type B, resulting in a new axon.

Main Theorem 2

- The 2nd main theorem causes a redirection of the impulse flow from neuron Type A to Type B. In this case, this redirection from Type (A => B) occurs when both neurons are active simultaneously.

4.2.3 Mathematical Algorithm for the Development of the KID

- The neurons A1-N1-Type A and A2-N1-Type B then redirect the impulse signals from the A1 line to the A2 line. The impulses from A1-S are thus influenced as follows:

○ From: (Hunger => Feeding) and (Satiety => Sleeping)

○ Follows:
(Hunger => A to B redirection => Sleeping) and (Satiety => Sleeping)

○ For:
F(I1A1) (t1 "A1-S") &&
F(I1A2) (t1 "A2-S")

○ With:
F(I1A1) (t2 "A1-N1-A") &&
F(I1A2) (t2 "A2-N1-B") &&
F(I2A1) (t2 "A1-S") &&
F(I2A2) (t2 "A2-S")

○ Follows: Create(A3) with (A1-N1-A => A2-N1-B)

○ And:
F(I1A1) (t3 "A2-N1-B") &&
F(I1A2) (t3 "A2-Act") &&
F(I2A1) (t3 "A1-N1-A") &&
F(I2A2) (t3 "A2-N1-B") &&
...

4.2.4 Behavioral Development of the KID

This means that the KID develops as follows:

● A1-S	=>	continuously sends impulses as a hunger signal.
● A2-S	=>	sends impulses only when sated.
● A1-Act	=>	feeding.
● A2-Act	=>	sleeping.
● A1 => A2-Act	=>	redirects the hunger impulse to sleeping instead of feeding as long as the KID is sated.

4.3 Summary

Chapter 4 provides a practical example of applying the developed concepts and algorithms in an artificially intelligent life form (KID).

Chapter 5: General Definitions

5.1 Vitality

The vitality of axons and neurons is described by their radius and strength.

5.1.1 The Radius

The radius describes a size-dependent performance capability of axons, determined by the relationship of charge per area. For neurons, this determines the volume, which represents space for charges.

5.1.2 The Strength

The strength is a mantle value of axons and neurons that describes the vitality of the elements. The strength is built up by impulses and decreases over time without impulses. By increasing or decreasing, the properties of the element regarding internal resistance and charge energy change. If it reaches zero, there would be no mantle on the element, and it can be immediately removed from the network.

5.2 Impulses

Impulses in a cerebral network are electrical energy potentials. They transport electrical charges as tokens through the network structure. With the transported charge, there is also structural renewal. An impulse is a simple value for the electrical charge potential and is exchanged, adjusted, and forwarded between neurons through axons like a special game piece. When neurons contain impulses, they emit an electromagnetic field. The electrical charge of the impulses is responsible for the emitted electromagnetic field and the associated near-field effects of neurons.

5.3 Summary

This chapter introduced elements from the category of general definitions of cerebral networks. These include the vitality of structural elements and impulses. The vitality describes the properties of axons and neurons with radius and strength. Impulses must also be known beforehand so that conclusions about their interaction can be drawn, otherwise, they would only become clear retrospectively.

Chapter 6: Structural Elements

6.1 Structural Elements of a Cerebral Network

The structural elements of a cerebral network include axons and neurons. Sensors and actuators (action handlers) belong to the external world of AI and are not structural elements of a cerebral network. These are connected to the outermost neurons in the system and represent a bridge between the cerebral network and the possibilities of AI. Additionally, there is another element, a shielding or limiting brain membrane to ensure the independence of information.

6.2 Delimitation of Independent and Purpose-Bound Areas

In cerebral networks, there are independent and purpose-bound areas that each fulfill specific functions. The delimitation occurs through brain membrane membranes. These act as a shield for purpose-bound areas, but the surface calculation of such a membrane is disproportionately complex. There are various mathematical approaches to this problem, but all are computationally intensive for irregular (heterogeneous) surfaces. In IT, spatial position determination is precomputed with bitmaps. However, this concept is pure waste of resources.

6.2.1 Virtual Spaces for the Delimitation of Areas

If we can design spaces (3D) virtually, we can distort the geometry of all structures independently. We can position a galaxy many times larger than the shoebox inside a shoebox. We distort the space and define the interior of the shoebox as virtually distorted and thus larger than the outer form of the shoebox. This means we will not use membrane surface calculations but virtual space distortions. We define different purpose-bound virtual spaces that connect with each other at certain virtual transition zones. The possibilities of virtual space distortions are only limited by imagination.

6.2.2 Example

We define two purpose-bound spaces. We connect these virtually in such a way that they are mostly separated by a shielding membrane. At the predetermined transition zones, we distort the virtual space so that a transition area is created between these spaces. These areas exist only through virtual space distortion between these spatial structures.

6.3 Primordial Seed (Superseed)

The primordial seed, also known as the superseed, is the initial state of the network that evolves polymorphically through structural growth.

6.4 Axons

Axons are tubular conduits through which electrical impulses are conducted from one neuron to other neurons.

6.5 Neurons

Neurons are considered impulse flow-controlling nodes in this work. The possible variants will be described later in this work.

6.6 Super-Neurons and Oligopolistic Neurons

Super-neurons are specialized neurons formed by merging multiple neurons. Oligopolistic neurons dominate certain areas of the neural network and play a key role in information processing.

6.7 Summary

Chapter 6 describes the basic structural elements of cerebral networks and their specific functions.

Chapter 7: Special Characteristics

7.1 Transmitters in Neurons

Transmitters and receptors play a crucial role inside neurons, especially at the connection points to axons. These chemical substances enable signal transmission between neurons and are essential for the function and communication of the neural network.

7.2 Near-Field Effects

Near-field effects describe interactions between neurons influenced by electromagnetic fields over short distances. These effects are crucial for the formation of new axons and the networking of neurons.

7.3 The Near-Field Theory

The near-field theory explains how neurons interact through electromagnetic fields within a limited near-field. This theory is fundamental for understanding neural communication and network adaptation.

7.4 The Near-Field Effects

The near-field effects are the specific impacts of electromagnetic fields on adjacent neurons. These effects can influence neuronal activity and the formation of new connections.

7.5 Threshold Resistance and Charge Congestion

Threshold resistance and charge congestion are mechanisms that regulate impulse transmission through axons. These mechanisms are crucial for controlling neuronal activity and signal transmission in the network.

7.6 Summary

Chapter 7 delves into the special properties and processes critical for the function and interaction of neurons and axons in neural networks. It describes the role of transmitters and receptors inside neurons, the electromagnetic near-field effects and their influence on adjacent neurons, and the near-field theory explaining how neurons interact through electromagnetic fields.

Chapter 8: Information Flow of Impulses

8.1 Axons and the Information Flow

An axon possesses an internal resistance derived from the charge per area in relation to the radius per mantle value. This dampens the impulses it transmits.

8.2 Uni- or Bidirectional Axons

Axons can be unidirectional but can also develop as bidirectional conduits. The bidirectional behavior occurs between two neurons, N1 and N2, when impulses are transmitted in both directions: from N1 to N2 and from N2 to N1.

8.3 Neurons and the Information Flow

- **Mirroring**: In mirroring, only one impulse is created to branch off. This must be so exact that it can be differentiated.
- **Quantizing**: Quantizations operate on the principle of "one-in-all-out." All outgoing axons of a certain type share the same incoming impulse.
- **Aggregating**: Aggregation of information from multiple impulses combines them into one.

8.4 Summary

Chapter 8 examines the properties of axons and their influence on the information flow in neural networks.

Chapter 9: Neurogenesis

9.1 Formation of Axons

The first of the two fundamental theorems states that new axons form between two simultaneously active and adjacent neurons if no axon already exists there.

9.2 Formation of Neurons (Axon Nodes)

The origin of a new neuron must lie on an axon since a neuron without impulses cannot function. After the primordial seed at the beginning of development, crossed axons are typical locations for the formation of new neurons.

9.3 Simplified Example Calculation of the Origin

Given neurons A, B, and C with coordinates:

- A (X, Y, Z) = (0, 0, 0)
- B (X, Y, Z) = (3, 0, 0)
- C (X, Y, Z) = (3, 4, 0)

Potentials:

- AU = 10V
- BU = 50V
- CU = 100V

and r as the distance between two neurons: $3^2+4^2=5^2$

Calculations:

- *AB: (A)=r**(BU/(AU+BU))=3*(50/ 60)=2.500 => (2.5, 0.0, 0.0)
- AC: (A)=r*(CU/(AU+CU))=5*(100/110)=4.545 => (2.7, 3.6, 0.0)
- BC: (B)=r*(CU/(BU+CU))=4*(100/150)=2.666 => (3.0, 2.7, 0.0)

The midpoint calculates as:

- AB: (2.5, 0.0, 0.0)
- AC: (2.7, 3.6, 0.0)
- BC: (3.0, 2.7, 0.0)

Result:

- AB: (2.5, 0.0, 0.0)
- AC: (2.7, 3.6, 0.0)
- BC: (3.0, 2.7, 0.0)

Thus, neuron D is defined as:

- f(A, B, C) = (x = 2.7, y = 2.1, z = 0.0)

9.4 Summary

Chapter 9 describes the processes of neurogenesis, including the formation and development of axons and neurons.

Chapter 10: Neuronal Switching Methods

10.1 The 8 Basic Interaction Types in Neurons

- **A => A**: No interaction
- **A => B**: Redirection
- **A + B => C**: Additive behavior
- **A - B => C**: Subtractive behavior
- **I1 + I2 + ... <= Threshold => A**: Throughput threshold
- **A => A & B**: Mirroring
- **A & B ... => C**: Aggregation
- **A => B & C & ...**: Quantification

10.1.1 No Interaction

The neurotransmitter does not respond to the electromagnetic fields of other active neurons but transmits the impulse to the intended axon.

10.1.2 Redirection

The impulse is redirected from A to B. If B is active, it is a pull operation; otherwise, it is a push operation. The impulse is diverted from its normal path and transmitted to another axon.

10.1.3 Additive Behavior

Here, the impulses from two axons are combined and transmitted to a third axon. This is a direct transformation as no threshold causes accumulation. Two transmitters of the same polarity are combined and transmitted to a subsequent axon (Frontiers The Journal of Neuroscience).

10.1.4 Subtractive Behavior

Similarly, the impulses from two axons are combined and transmitted to a third axon. Two transmitters of opposite polarity are transmitted to a single axon, resulting in a comparison criterion based on the difference in charges. This opposite polarization corresponds to a normal agonist and an inverse transmitter (Frontiers The Journal of Neuroscience).

10.1.5 Throughput Threshold

The throughput threshold accumulates multiple impulses to a common minimum charge before transmitting them as a single impulse. During this accumulation, an increased total impulse is generated, but a temporal charge loss dampens this. The actual damping is attributed to the vitality of the axon, which includes a certain power loss due to internal resistance (Frontiers).

10.1.6 Mirroring

In mirroring, an exact copy of the charge is branched off. This serves either differentiation or preservation of the original information.

10.1.7 Aggregation

Aggregation links closely adjacent active neurons together according to the first fundamental theorem of neurogenesis. Similar information is automatically linked and aggregated (The Journal of Neuroscience).

10.1.8 Quantification

Quantification is the reverse process of aggregation. Divergent associative connections, such as lateral entanglements or cross-connections to further independent information, are created through quantification (The Journal of Neuroscience).

10.2 Summary

Chapter 10 examines the different types of switching methods in neurons and their significance for the functionality of neural networks.

Chapter 11: Types of Neurotransmitter Interactions

11.1 Properties and Interaction Types of Transmitters

Neurotransmitters can be polarized. This translates the charge of the impulse so that the polarization of the transmitters is emitted from the neuron accordingly.

11.2 Types of Polarization

- No polarization
- Positive
- Negative

11.3 Interactions Through Polarization

According to polarization, there are also interactions among transmitters. Thus, attraction and repulsion of impulses in adjacent neurons are possible.

11.4 Types of Interactions

- No interaction
- Attraction of adjacent impulses
- Repulsion of adjacent impulses
- Additive union in the neuron
- Subtractive union in the neuron

11.5 Threshold Control

Threshold control by transmitters scales the impulses accordingly. Information transmission can also be accelerated or accumulated by lowering and raising the threshold.

11.6 Transistor Behavior

Regarding internal control of a neuron, axons can be selectively opened or closed.

11.7 Summary

Chapter 11 describes the fundamental properties and interaction types of transmitters in neural networks.

Chapter 12: Oligopolistic Behaviors

12.1 Oligopolistic Properties of Neurons

Oligopolistic neurons are neurons where different transmitter types dominate. These transmitters cause different behaviors and properties in neurons.

12.2 Properties of Oligopolistic Neurons

- Matching transmitter types: The receptor type at A1-N1 corresponds to the input transmitter type at A1-N2.
- Activation of transmitters: Impulses activate all transmitters within the entry point.
- Size of entry points: The size of the entry points corresponds to the axon cross-section.

12.3 Summary

Chapter 12 describes the properties and functions of oligopolistic neurons, where different transmitter types dominate and cause varied behaviors and properties.

Chapter 13: Polarization

13.1 Internal Polarization of a Neuron

An impulse in a neuron activates it and generates internal polarization, emitting an outward-directed electromagnetic field (EM field).

13.2 Interactions at Neurons

Different types of neurons and transmitters allow for various interactions to be freely designed.

13.3 Manipulation of AI Through Polarization

13.3.1 Use of Neurotransmitters

To influence the network's behavior, additional neurotransmitters are used to form an independent and polarizing skeleton. This macroscopically polarizing system allows for targeted and intelligent manipulation of AI.

13.3.2 Control Through Polarization

Provided the primordial seed is correctly defined, AI can be controlled through polarization. Logically coherent structures must be defined convolutedly so that polarization causes a behavior change, appearing spatially adjacent.

13.3.3 Reactions in the Spatio-Temporal Network (STN)

Different polarization directions in the spatio-temporal network (STN) create variations in the subconscious reactions. These reactions stem from the instinctive and/or emotional skeleton.

13.3.4 Influence of the Emotional and Instinctive Skeleton

The emotional skeleton causes situationally adapted reactions through polarization based on different causes. Emotional pressure leads to subconscious behavioral adjustments, while instinctive pressure triggers reflexive reactions. Both mechanisms manipulate AI behavior through polarization.

13.4 Summary

Chapter 13 describes the internal polarization of a neuron and its effects on impulse flow, as well as the manipulation of AI through polarization.

Chapter 14: Additional Rules for Neurons

14.1 Neurotransmitters in Neurons

The neurotransmitters of a neuron are determined by various circumstances. An initial specification through the definition in the superseed is the first possibility.

14.2 Conversion of Impulse Potentials

Impulse potentials can add or subtract. In addition, the charges of transmitters of the same polarity are combined and transmitted as a sum through a designated axon.

14.3 Threshold-Based Charge Throughput

A threshold acts as resistance that controls the transition of impulses from the neuron to the axon. This resistance ensures an individually grown threshold.

14.4 Influence of Impulse Flow

An EM field can generate both microscopic near-field effects and influence macroscopic decisions. These decisions consist of many aggregated impulses in an area.

14.5 Influence on Axon and Neuron Formation

Increased field strengths extend the range of neurogenesis near-field effects. The range of neurogenesis corresponds to the formation of axons and neurons and thus the field strength of the electromagnetic field from active neurons nearby.

14.6 Summary

Chapter 14 describes the various influences of neurotransmitters and electromagnetic fields on the conversion of impulse potentials, threshold-based charge throughput, influence on impulse flow, and formation of axons and neurons.

Chapter 15: Transformed Dependencies

15.1 Transistor Behavior

For transistor behavior within a specific neuron, independent transmitter/receptor pairings are required. These serve as regulators for impulse flow through the channels, similar to transistors in electronics.

15.2 Possible Transformation Behaviors of Neurons

- Attenuation of impulse potentials: Neurons can attenuate the potentials of impulses to enable more precise control over signal transmission.
- Controlled throughput of impulses: The transistor-like behavior of neurons allows for precise control of impulse flow.
- Accumulation and congestion of impulse potentials: Neurons can accumulate and congest impulses to increase the total charge before transmission.

15.3 Summary

Chapter 15 describes transistor behavior and controlled throughput thresholds in neurons. It explains the fundamentals of transistor behavior and possible transformation behaviors, including attenuation of impulse potentials, controlled throughput of impulses, and accumulation of impulse potentials.

Chapter 16: Pain

16.1 The Occurrence of Pain

The occurrence of pain can lead to immediate and permanent changes in behavior and neural structure.

16.2 Burned Axons

Burned or charred axons result from excessively high impulses. Their mantle value would significantly increase relative to the radius, thus increasing their internal resistance.

16.3 Inflamed Neurons

Inflamed neurons would have their structural vitality altered, causing them to continuously send extreme impulses.

16.4 Counter-Effects in Pain

- Signal diversion to actuators: By diverting signals to external actuators, the load on neurons can be reduced.
- Subtractive conversion to dampen signals: This method reduces signal strength by subtracting opposite impulses.
- Temporal and threshold-based damping: Impulses are dampened through temporal delays and threshold-based mechanisms.
- Spatial flooding with a virtual anesthetic effect: By targeted flooding of an area with a simulated anesthetic effect, harmful impulses can be neutralized.

16.5 Summary

Chapter 16 describes the occurrence and behavior of pain in neural networks and the resulting changes, as well as counter-effects to dampen and avoid harmful impulses.

Chapter 17: Suggestion of a Data Structure

17.1 ORM: Object Classes for DB

17.1.1 Common Definition

- **Vitality**: Structural elements, including axons and neurons, possess vitality, indicating their strength and diameter. The diameter is a value that scales the ratios of electrical forces. The larger the diameter and, thus, the element, the higher the electrical potentials that can be processed. The strength value describes the mantle thickness of neurons and axons and their life expectancy.
    - ID: Number
    - Timestamp last update: DateTime in microseconds
    - Strength: Number
    - Diameter: Number
    - Renewal rate: (Strength + change) as Number
    - Decay rate: (Strength - change) as Number
- **Impulse**: Impulses are the energy from which information is formed, shaped by neurons and axons. Neurons and axons shape the charges of impulses through their resistance values and cumulative limitations.
    - ID: Number
    - Electrical Potential: Number
    - Information Type: ID Transmitter Type
    - Position: ID Spatial Coords
    - ActiveNeuronID: ID Neuron
    - Timestamp last update: DateTime in microseconds

17.1.2 Structural Elements

Structural elements are physical structures like neurons and axons. Beyond these structures, there are messenger substances - neurotransmitters stored in neurons. These are physical elements, even though they are excluded from the structural formation because they exist hidden within neurons. They are assigned as element-specific.

- **Axons**: Axons are structural elements connecting neurons to transport impulses between them. Axons also have neurotransmitter specifications related to the signal type transmitted through oligopolistic neurons. The transmitters are retained from the origin to the target neuron.
    - ID: Integer
    - TransmitterType: Transmitter ID Transmitter Type
    - Receptor: ID Transmitter Type
    - Spatial Coordinates: Origin ID Spatial Coords, Destination ID Spatial Coords
    - NodeIDs: From NodeID ID Neuron, To NodeID ID Neuron
    - Vitality: ID Vitality
- **Neuron**: Neurons are nodes in the network controlling the path of impulses and, thus, influence. Neurons determine the path of impulses in the network and

interact in various ways. Although transmitters work inside them, they are bound to the entry points in this model.
  - ID: Integer
  - NodeType: Set of Types
  - Axons: IDs Axon
  - EntryPoints: IDs EntryPoint
  - Vitality: ID Vitality
- **TransmitterType**: Neurotransmitters are defined concisely here and refer to the Transmitter Type Behavior object for their characteristics but have a link to a neuron.
  - ID: Integer
  - Name: String
  - NodeID: ID Neuron
  - InteractionLogicID: ID Transmitter Type Behavior

17.1.3 Element specific

- **ConnectedAxonOfNode**: This object contains references to other object classes, keeping structural objects (axon, neuron, and entry point) together in this dataset.
  - ID: Integer
  - AxonID: ID Axon
  - NodeID: ID Node
  - EntryPointID: ID Transition Point
- **Transition Point**: This is the transition point between neuron and axon, either incoming or outgoing. The attribute list of this object is concise but holds the most critical information.
  - ID: Number
  - Radius: Number
  - PolarCoordsAngle: From the center of the sphere
  - TransmitterTypes: IDs TransmitterTypes
- **Transmitter Type Behavior**: The attribute list of this object is concise but holds the most critical information. It contains a string for its name, references an action method, and a catalog for various behaviors.
  - ID: Integer
  - Name: String
  - Interaction: ID to defined method
  - InteractionLogicID: ID to defined behavior record

17.1.4 Helper Element

- **Spatial Coords**: Sometimes, spatial coordinates in a 3-axis format are needed because their implementation is advantageous. This way, various points in space can be better assigned using the 3-axis system, and closely adjacent neurons can be more easily determined.
  - ID: Number
  - X-Axis: Number
  - Y-Axis: Number

  - Z-Axis: Number
- **Polar Coords**: Sometimes, spatial polar coordinates are needed because their implementation is advantageous. This implementation is preferred for the connection point between axon and neuron. From the center of the spherical neuron, a point on the sphere is only two angles away if the radius is set to one. This requires 2 instead of 3 operations but only works if the radius is set to one. This is always permissible if the radius of a sphere is the basis on which a point on the surface (entry point) must be determined.
  - ID: Number
  - Radius: Number
  - AlphaAngle: Number
  - BetaAngle: Number

17.2 Summary

Chapter 17 suggests a possible data structure for implementing the described concepts and mechanisms in a neural network.

Chapter 18: Appendices

18.1 Glossary

- **Axon**: A long, thin extension of a neuron that conducts electrical impulses away from the cell body to other neurons or target cells.
- **CREB-1**: cAMP Response Element-Binding Protein 1, a protein involved in regulating gene expression.
- **EM Field**: Electromagnetic field emitted by active neurons.
- **KID**: Artificial intelligent life form, a model to illustrate the theoretical concepts in the document.
- **Neurogenesis**: The process of growth and development of new neurons and axons.
- **Threshold Resistance**: The resistance of the transition from a neuron to an axon, describing the minimum charge required to transmit an impulse.
- **STN**: Spatio-temporal network, a model describing the spatial and temporal interactions of neurons and axons.
- **Superseed**: The primordial seed or initial element from which neural structures develop.
- **Transmitter**: Chemical substances that transmit signals between neurons.

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