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Cerebral Networks

Rethinking Neural Networks

Summary:

This document discusses cerebral networks for AI development. The principles are derived from the behavior of the human brain and provide an answer to how virtual interactive control of neural nodes can work. This approach includes neurogenesis with mechanisms of growth and decay of the network. It pursues a variety of concepts for neurons that influence and control each other in various forms. This esoteric approach aims to recognize and understand the possibilities and adapt the required new ways of thinking.

This informative "request for comments" aims to introduce the concepts of cerebral networks to gain recognition and collaboration with a broader expert audience.

Status of This Memo: DRAFT

This document is published for informational purposes. It is an independent submission reflecting work from October 17, 2018, to June 2024.

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Introduction

About the Project Foundation

This project began on October 17, 2018, following the insights from the first two fundamental theorems three days prior. The fundamental theorems provided answers to the questions of how axons grow and how dendrites switch. The goal of this approach was to mimic the information processing that occurs in the human brain. Up until the start of the project, the challenge was to solve the puzzle of dendrite switching and their connection logic. The quest was to find an answer to how they purposefully distribute impulses to axons and how axons connect individual neurons. The two fundamental theorems were the beginning of a solution to this.

This work represents an esoteric approach. The first two fundamental principles require innovative thinking that needs to be discovered and adapted. The new ways of thinking found are summarized in this work and presented on the following pages.

Main Concepts

1. Evolution from a primal seed or superseed
2. Neurogenesis concepts for the growth of axons and neurons
3. Neurogenesis concepts for the decay of axons and neurons
4. Representation as a spatio-temporal network
5. Spherical neurons for transmitter and receptor behavior
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7. Threshold resistance and transformation of impulses in neurons
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18. Concepts for super neurons (fusion of many neurons)

The Origin Idea and the 2 Fundamental Theorems

Prerequisite of this idea

Impulses in the neurons activate them.

1. If a neuron contains at least one impulse, it is considered active.

2. Only active neurons emit an EM field.

Closely neighboring and simultaneously active neurons generate new axons that connect them. They also influence each other in the choice of further paths for the impulses in them through the spatio-temporal network (STN). The distance for the creation of connecting axons is intended to be limited for simplicity.

As a result, impulses must be present simultaneously in neurons that are spatially close to each other so that mutual interactions can occur in two forms:

The 2 Fundamental Theorems

1. (EM near field + cerebrospinal fluid)
   Neurons connect with new axons in various forms.

2. (Receptor and neurotransmitter logic)
   Impulses branch through mutual influence according to defined cases.

Example of an Auto-Actuator Model

Use case description

This example concerns the simplest form of existence. It can eat or sleep and is driven by hunger and satiety signals. It will develop so that it stops eating when it is full and sleeps until its hunger drives it to eat again.

Flowchart - Pseudo Code

1. A simple signal transport initiated by the sensor for "hunger". Continuously, impulses are directed through the axon "A1" to the "eat" action.

2. A conditional signal transport initiated by the sensor for "satiety". Under the condition of being full, impulses are directed along axon "A2" to the "sleep" action.

3. On A1, there is a neuron named "A1-N1-Type A" and nearby on A2, a neuron named "A2-N2-Type B".

4. The continuous hunger signal leads to eating, and the conditional satiety signal leads to sleeping.

5. Hunger and satiety both send signals.

6. If impulses (signals) are present simultaneously at neurons "A1-N1-Type A" and "A2-N2-Type B", a connecting axon “A to B Detour” is formed between them.

7. The impulses in "A1-N1-Type A" are conditionally redirected through “A to B Detour” to "A2-N2-Type B". The detour is conditional on the simultaneous satiety signal, causing the constant hunger to turn into sleeping as long as satiety is maintained.

8. If satiety is no longer present, constant hunger prevails until the form of existence is full and begins to sleep again.

Development Process

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

The 1st main theorem leads to the connection of "A1-N1-Type A" and "A2-N1-Type B" and thus to a new axon. The 2nd main theorem then causes a redirection of the impulse flow from neuron type A to type B. In this case, the redirection (A => B) occurs when both neurons are simultaneously active. 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 influenced as follows:

From: (Hunger=>Eating) and (Satiety=>Sleeping)

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

```
for:     F(I1,A1) (t1, "A1-S") &&
         F(I1,A2) (t1, "A2-S")

with:    F(I1,A1) (t2, "A1-N1-A")&&
         F(I1,A2) (t2, "A2-N1-B") &&
         F(I2,A1) (t2, "A1-S") &&
         F(I2,A2) (t2, "A2-S")

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

and:     F(I1,A1) (t3, "A2-N1-B") &&
         F(I1,A2) (t3, "A2-Act" ) &&
         F(I2,A1) (t3, "A1-N1-A") &&
         F(I2,A2) (t3, "A2-N1-B") &&
         …
```

The AI will evolve as following:

```
"A1-S"          => continuously sends Impulses as hunger signals
"A2-S"          => sens only Impulses in state of satiety
"A1-Act"        => Feed
"A2-Act"        => sleep
"A1 => A2-Act" => Redirects hunger signal to sleep instead of feed as
                  long as the AI is satiated
```

General Definitions

Vitality

The vitality of axons and neurons in this work is sufficiently described by the indications of radius and strength. The radius describes a size-dependent performance based on the relationship of charge per area. It is determined by the diameter of axons and neurons. With a larger radius of the structural elements, the strengths of the electric charges are increased, and thus the associated effects are stronger. The radius itself can only be replaced by the strength indication to a limited extent.

The strength indication serves as a mantle value and indicates the amount of structural substance of the corresponding element. It is reduced during structural degeneration and increased during renewal. An element is considered completely degraded when its strength value reaches zero and can be completely removed. Renewal of strength occurs through electrical impulses that immediately renew the structure they claim during use. Degradation is intended as a temporally constant process.

Structural Elements

The structural elements of a cerebral network include axons and neurons. Sensors and actuators (action handlers), on the other hand, belong to the outside world of AI and are not structural elements of a cerebral network. They are connected via the schematically outermost neurons in the system and form a bridge between the cerebral network and the possibilities of AI. For the independence of information, limiting elements must be designed through virtual spatial representation as non-existent space and/or insulating brain membranes.

Delimitation of Independent and Purposeful Areas

The delimitation of special areas is intended to isolate complex signal processing from information not related to the individual processes. This allows for meaningful processing in a delimited network area. Independent information is thereby deliberately linked only with completed information. A closed or delimited processing area thus enables meaningful processing of information from a specific context. This includes information processing of all kinds and at all levels.

Primal Seed also Superseed

The primal seed is the basic structure of a cerebral network in its initial state before first operation. It serves as the foundation for further structural development. This primal seed consists only of a minimum of structural elements because interweavings, including the formation of new neurons, grow automatically in cerebral networks through the neurogenesis process. Independent information can interact or be separated.

Impulses

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

Axons

Axons serve as cylindrical pipelines for the transport of electric impulses between two neurons. They are immediately formed between simultaneously active and closely neighboring neurons. With more than two associated neurons, axon nodes are formed. Normal axons have an ordinary transmission resistance and only transport impulses beyond a certain threshold.

Neurons

Neurons imitate synapses and are simply defined as spherical structures. This serves the implementation of a transmitter-receptor logic. Neurons exchange charges in the form of impulses with each other through axons and are considered active as long as they harbor an effective charge. They influence their switching modes within a near-field effect area mutually. This effect is based on the influences of EM fields of closely neighboring active neurons. A possible origin location for neurons is an axon node. Neurons need connected axons to receive and forward an impulse. Connecting axons automatically form between closely neighboring and active neurons. However, if a neuron loses its last connection in the system, it can be immediately removed.

Super Neurons and Oligopolistic Neurons

With the increasing intertwining through neurogenesis, super neurons eventually form, containing the old neurons and increasing their electromagnetic potentials and vitality as a union. A super neuron can be summarized here as a single object formed from many fused neurons. The associated poles transform into a single fused pole, with their EM field lines only on the outside.

Under certain conditions, the structure can transform into a single neuron. By ensuring that the transmitters in a super neuron can be clearly assigned to their original neuron, even complex transformations appear possible. A super neuron may house various transmitters and their properties. Therefore, it is necessary to distinguish neurons with multiple transmitter types. These oligopolistic neurons represent various properties in a single neuron. This is defined by the formation of connections of multiple origins and axons of different types.

Special Characteristics

Transmitters in Neurons

Inside the fictional spherical neurons, transmitters and receptors are located. They are situated inside the sphere at the connection point to an axon. This area is defined as the radial connection point of an axon with a neuron. According to the axon radius size, the radial connection point is the area for transmitter bindings. The resulting transmitter type is optionally kept as both input and output type at both ends of the axon and/or follows specific behaviors of a particular neuron type. In the case of multiple overlapping axon connection points, the transmitters at the overlaps mix with those of other axons there.

Near-Field Effects

The near-field is defined as the limited effective range of the electromagnetic fields of neurons. The range of the near-field effects depends on the field strength of the EM field. Within these ranges, closely neighboring neurons can influence each other, and connecting axons can form between them. The near-field theory emerged at the very beginning with the first fundamental theorem. It was about the formation of new axons. The near-field construct justified all other effects such as the influences of neurons on each other. Near-field effects refer to highly increased magnetism at very short distances of the electromagnetic charge of individual impulses in neurons.

Near-field effects are all effects where a minimal distance is present, resulting in effective electromagnetism. New structures may form due to magnetically aligned CREB-1 proteins. The switching mode of neurons is also influenced, thus affecting impulse flow.

Threshold Resistance and Charge Accumulation

Axons have a threshold resistance derived from strength and radius. The radius describes the axon size in cross-section and it holds: "radius per strength" for internal resistance. Since charge per area applies, thick axons can introduce large charges according to their connection point area. Consequently, neurons need to accumulate more charge for transmission. Axons allow charges to pass only beyond a certain minimum size due to their internal resistance, acting as an impulse-injecting clock of the network. This explains charge accumulation in neurons before an axon siphons off this as a single impulse upon transmission from the neuron.

Information Flow of Impulses in Axons and Neurons

Axons and Information Flow

Damping Properties of Axons

An axon possesses internal resistance calculated from the charges per area relative to the radius per mantle value, thereby damping the impulses it transmits.

Uni- or Bidirectional Axons

Axons can be unidirectional or develop as bidirectional lines. The bidirectional behavior would be given between two neurons N1 and N2 if they transmit impulses in one direction from N1 to N2 and in the opposite direction from N2 to N1. This requires two different transmitters T1 and T2. Transmitter T1 transmits impulses from N1 to N2, and transmitter T2 transmits from N2 to N1.

Neurons and Information Flow

Mirroring

Mirroring creates only one impulse to branch off. It must be precise enough to differentiate.

Quantizing

Quantizing works on the principle of "one-in all-out". Here, all outgoing axons of a particular type share the same incoming impulse, which is then distributed to the respective axons at the neuron.

aggregating

Information aggregation combines multiple impulses into a single one. The combined impulse potentials contain thematically related information along with their linked position.

Further Influences: Quantizing and aggregating

Where impulses converge, a network pattern forms that is suitable for unfolding the desired information by reversing the direction. Bidirectional axons form automatically in this context. When the chain of signals activates two consecutive neurons seamlessly, bidirectional associations are ensured.

Active Neurons Send Impulses to Inactive Ones

Although much attention has been paid to active neurons so far, impulses are also sent to inactive neurons. Thus, their choice is determined by the EM fields of active neurons and the associated near-field effects.

Neurogenesis

Neurogenesis refers to the autonomous formation of new neural structures. Under certain conditions, new neurons and axons are automatically formed, maintained, or degenerated. Structural change through neurogenesis serves the automatic improvement of AI itself. Logically related information is automatically aggregated, and cross-connections with other independent information arise through neurogenesis.

Axon Formation

The first of the two fundamental theorems explains that new axons form between two simultaneously active neurons. When two neighboring neurons are simultaneously active, a connecting axon forms there if it does not already exist. The growth of this axon is limited to a certain distance, measured according to the intensity of the electromagnetic fields. According to the first fundamental theorem, axons form along the magnetic field lines. This is a complex calculation that can be simplified with direct connections between two neurons.

Neuron Formation (Axon Nodes)

The position for the origin of a new neuron must lie on an axon; otherwise, it never receives impulses. Beyond the super seed at the beginning, crossed axons are the site for the formation of new neurons. In simplification, axons are defined as a direct connection between two neurons, but for the formation of axon nodes, the direct connection is problematic. Electromagnetic field lines as an axon growth scheme lead to axons crossing along magnetic field lines, forming a node at this point. As a virtual imitation, the calculations are very complex, hence requiring a simplified method for determining a suitable origin point.

Calculation of a Simplified Origin Point

Through a neurogenesis effect radius, the calculation can be reduced. The neurogenesis radius is the distance from one neuron to all other neurons within whose range neurons can interact. Therein, all simultaneously active neurons are connected by missing axons. With more than two active neurons, an axon node forms, which is converted into a new neuron. An approximated origin point of the neuron can thus be calculated as a spatial center. For better precision, the origin point is adjusted so that "radius = potential/distance" defines the calculated location of the new neuron.

Example Calculation of the Origin Point

Neurons A, B, and C with
A (X Y Z) = 000
B (X Y Z) = 300
C (X Y Z) = 340

Potentials AU, BU, and CU
AU = 10V
BU = 50V
CU = 100V

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

```
AB: (A)=r*(BU/AU+BU) = 3*  50/ 60 = 2.5 => 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 is then calculated as
AB: 2.5 0.0 0.0
AC: 2.7 3.6 0.0
BC: 3.0 2.7 0.0

```
ABC: f(x) (2.5+2.7+3.0)/3 = 2.7
     f(y) (0.0+3.6+2.7)/3 = 2.1
     f(z) (0.0+0.0+0.0)/3 = 0.0
```

Neuron D is then defined as f(A B C) = (x=2.7 y=2.1 z=0.0)

Neural Switching Modes

Types of Neuron Interactions

There are 8 different basic interaction types in neurons resulting from the neuron input to output.

1. A => A No Interaction
2. A => B Detour
3. A + B => C Additive Behavior
4. A - B => C Subtractive Behavior
5. I1 + I2 + … <= Threshold => A Flow Threshold
6. A => A & B Mirroring
7. A & B … => C aggregating
8. A => B & C & … Quantizing

In Detail

1. No Interaction:
   The neurotransmitter does not respond to the EM fields of other active neurons, even though it still emits an EM field. It transmits the impulse to the intended axon.

2. Detour:
   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 redirected from its normal path and transmitted to another axon.

3. Additive Behavior:
   Impulses from two axons are combined and transmitted to a third axon. This is a direct transformation as no threshold causes accumulation. In this process, two transmitters of the same polarity are jointly transmitted to a single further axon.

4. Subtractive Behavior:
   Impulses from two axons are combined and transmitted to a third axon. This is a direct transformation as no threshold causes accumulation. In this process, two transmitters of opposite polarity are jointly transmitted to a single further axon. This results in the difference of the two charges and thus a comparison criterion. The opposite polarization corresponds to a normal agonist and an inverse transmitter.

5. Flow Threshold:
   The flow threshold accumulates multiple impulses to a common minimum charge before transmitting this total charge as a single impulse. During this accumulation, an increased total impulse occurs. Furthermore, there is a temporal charge loss that dampens the charge accumulation, but the actual damping is attributable to the vitality of the axon, which includes a certain power loss through internal resistance.

6. Mirroring:
   Mirroring is about directly branching off an exact charge copy. This can be justified for differentiation purposes or to preserve original information.

7. aggregating:
   aggregating links closely related active neurons together according to the first fundamental theorem of neurogenesis. This means similar information is automatically linked, aggregating related information.

8. Quantifying:
   Quantifying is the reversal of the aggregation process. Divergent associative connections, i.e., lateral interconnections or cross-connections to other independent information, arise only through quantifying.

Types of Neurotransmitter Interactions

There are various basic properties and interaction types in transmitters.

1. Polarization (+ 0 -)
    a. No Polarization
    b. Plus
    c. Minus
2. Interactions Through Polarization
    a. No Interaction
    b. Attraction of neighboring impulses
    c. Repulsion of neighboring impulses
    d. Additive union in the neuron
    e. Subtractive union in the neuron
3. Threshold Control
    a. No Threshold
    b. Increase
    c. Decrease
4. Transistor Behavior
    a. Neuron Flow Control
    b. None
    c. Open channels of receptors
    d. Close channels of receptors

In Details

1. Polarization (+ 0 -):
   Neurotransmitters can be polarized. This translates the charge of the impulse so that the transmitter polarization from the neuron is emitted accordingly.

2. Interactions:
   According to polarization, interactions in transmitters are possible. Thus, attraction and repulsion of impulses in neighboring neurons are possible. The two forms of charge union over different transmitters are also possible. The additive or subtractive union serves a mathematical purpose in information processing. The purpose of these unions is the possibility of comparison and evaluation concerning the network's information processing.
3. Threshold Control:
   Through threshold control by transmitters, impulses are scaled appropriately and transmitted. Information transfer can also be accelerated or stalled by lowering and raising the threshold.

4. Neuron Flow Control:
   Concerning internal neuron control, axons can be selectively opened or closed. This can range from general for all to selectively corresponding to the receptor.

Oligopolistic Behaviors of Neurons:

Oligopolistic neurons involve various transmitter types prevailing in one neuron. They cause different behaviors and thus properties of neurons. Thus, oligopoly stands for a multitude of properties and thus transmitter systems in the neuron.

For Oligopolistic Neurons:

1. Output receptor type at A1-N1 = Input transmitter type at A1-N2: This means that the output transmitter in the first neuron sets the same transmitter in the second neuron at the entry point of the axon.

2. Impulses activate all transmitters within the entry point.

3. The size of entry points corresponds to the axon cross-section.

4. Location-dependent transmitter (T1) specifications (100% T1 + In=Out Tx): According to the definition of the primal seed/super seed, a basic framework of axons and neurons is defined, and the transmitter interaction must also be predefined. Here, the primal neurons can be defined so that their entire inside is lined with a defined transmitter.

5. Internal regulating control effect: When an incoming impulse activates a zone within a neuron with various transmitter types, the neuron transmits impulses of the various types along the corresponding axons. Alternatively, it consumes them otherwise, such as for internal control processes. Here, the threshold resistances of other transmitters can be influenced. These can regulate type-specific impulse channels in oligopolistic neurons.

Polarization

Internal Polarization of a Neuron

An impulse in a neuron activates it and creates an internal polarization of the neuron, emitting an outward-directed EM field. This results in interactions of the impulse flow. These can influence the selection of type-specific output axons. Since calculations with electromagnetic fields are very complex, they are reduced to a pre-calculated value of influence. This means that pre-calculated influence vectors, scaled according to the potential of polarized neurons, can be used. This influence is limited to a definable radius.

Polarization and its Interactions in Neurons

For different types of neurons and transmitters, different interactions can be freely designed. The attraction and repulsion of neurotransmitters can influence the effect of impulses through electromagnetic polarization. This is an internal effect. The external effects are those that specifically influence the behavior of the neuron as previously described in "Types of Neuron Interactions".

Manipulation of AI through Polarization

To influence network behavior, another neurotransmitter system is used. This independent and also macroscopically polarizing system achieves intelligent influence. This is caused by changes in the impulse flow that adapt behavior to a given situational change. As a counteracting system, it largely influences behavior as an independent transmitter system. It corresponds to a subconscious or reflexive system in humans that influences decision-making or leads to immediate reactions in danger.

Further Rules for Neurons

1. Neurotransmitters in Neurons:

   The transmitters of a neuron are determined by various circumstances. An initial specification by the definition in the super seed is the first possibility. For newly forming neurons, the zone in which they are located can also be designated as a default transmitter assignment zone. Combinations arise considering the rule of input equals output at the axon.

2. Conversion of Impulse Potentials:

   Impulse potentials can add or subtract. Constructs with multiple transmitters are considered. When adding, the charges of transmitters of one polarity are combined and transmitted through a designated axon as a formed sum. When subtracting, a difference is formed from a bipolarity of differently polarized transmitters. This feature enables distinctions and evaluations. This involves an ambivalent agonism. A normal agonist with one polarity and an inverse with opposite polarity. The sum of both polarities is then the difference.

3. Threshold-Based Charge Throughput:

   A threshold value acts as a resistance for impulses to transition from the neuron to the axon. This resistance ensures an individually grown threshold. Due to the accumulation of impulses before the threshold until the impulse is forwarded, there is a temporal charge loss. The threshold logic also results in transistor-like switching behavior. Here, a transmitter scales the impulse transmission of another transmitter. More on this in the following chapter section.

4. Influence of Impulse Flow According to EM Field:

   An EM field can generate both microscopic near-field effects and influence macroscopic decisions with an appropriate structure. These decisions consist of many aggregated impulses of an area and can be specifically influenced by an independent transmitter system with a macroscopically polarizing influence. Throughput thresholds can also vary according to EM fields. In the near-field range, the attraction or repulsion of neighboring impulses is a possible influence, as is no effect on individual transmitter types.

5. Influence on Axon and Neuron Formation:

   Increased field strengths expand the range of neurogenesis near-field effects. Thus, the neurogenesis range of axon and neuron formation corresponds to the field strength of the electromagnetic field from nearby active neurons. Electromagnetic potentials also influence the position of newly forming neurons.

Transformed Dependencies

Transistor Behavior - Controlled Throughput Threshold

For transistor behavior within a special neuron, independent transmitter/receptor pairing is needed. These require a throughput control from a single neurotransmitter/receptor within the neuron type for the transmission of an impulse through another transmitter. Like a transistor, there would then be the base transmitter regulating the throughput and a receiver/emitter as the input and output of the signal to be scaled.

Possible Transformation Behaviors of Neurons

Potential scaling can:

1. Weaken impulse potentials

2. Regulated throughput of impulses - Transistor behavior

3. Accumulate potentials of impulses

These conditions control the amount of simultaneous impulse potentials. The necessary control of the impulse threshold (transformation logic) describes the above behavior. In this way, transformation can precisely weaken or amplify impulses. Output signals are amplified or weakened by accumulating multiple impulses and their correct scaling. The temporal behavior of damping and accumulation is determined by the speed of the signal sequence.

Pain

The occurrence of pain can lead to immediate and permanent changes in behavior and neural structure. Although it may seem strange to implement pain behavior, there are several possible applications for controlling AI behavior.

To Imitate this Process, Impulses Must Have Damagingly Large Potentials. As a result, changes occur in the network, causing structural elements to behave like burnt axons or inflamed neurons.

Burnt or charred axons arise from excessively high impulses. Their mantle value increases significantly relative to the radius, thus also increasing their internal resistance. Consequently, these axons only allow extremely large impulses to pass through and act as a shielding wall blocking signals.

Inflamed neurons, on the other hand, have their structural vitality so altered that they continuously send out extreme impulses. Large impulses also cause a significant increase in the radius but not as much in the mantle value (strength). Since radius per strength applies to internal resistance, this results in a large charge accumulation and too small an internal resistance. This leads to significantly increased impulse charges and continued scarring.

Counter Effects for Pain

1. Divert signals to actuators

2. Subtractive transformation to dampen signals

3. Temporal and threshold-based damping

4. Spatial flooding with a virtual anesthetic effect

These counter effects reduce the number of impulses and potentials in the neurons. By selectively determining possible sources or causes of pain, behavior can be imposed on AI, such as damage-avoiding behavior.

Code Example

Approach for Designing a Possible Data Structure

Object Classes

Impulses

- ID: Number
- Electrical Potential: Number
- Information Type: Set of Types
- Position: Spatial coordinates (xyz)
- ActiveNeuronID: NeuronID
- Timestamp last update: DateTime in microseconds

Elements Vitality

- ID: Number
- Timestamp last update: DateTime in microseconds
- Strength: Number
- Diameter: Number
- Renewal rate: (Strength+change) as Number
- Decay rate: (Strength-change) as Number

Axons

- ID: Integer
- Transmitter Type: Set of types
- Receptor Type: Set of types
- Polar Coordinates: origin destination
- Spatial Coordinates: origin destination
- IDs: From NodeID To NodeID
- Vitality: OwnVitality

ConnectedAxonOfNode

- ID: Integer
- AxonID: ID
- NodeID: ID
- EntryPointID: ID

EntryPoint

- Radius: Number
- PolarCoordsAngle: From Center of the Sphere
- Transmitter Types: IDs

Transmitter Type

- ID: Integer
- Name: String
- InteractionLogicID: ID to defined behavior record

Neural Nodes (Neurons)

- ID: Integer
- Node Type: Set of types
- EM-Field-Strength: Number (sum of residing potentials)
- Spatial Coordinates: origin(xyz)
- IDs: Set of (ConnectedAxonID EntryPointID)
- Used Types List: List of Transmitter IDs
- Vitality: OwnVitality

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