

Biophysical Mind Units and Leibniz's Law in Practice

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Abstract

Objectives: Externally absorbed/translated or internally retrieved from memory storage mobile biophysical mind units [bmu], stimulate immobile inseparable topographical neuronal webs connectivity, to intimately attach to ions to travel them via their channels media, to be measured based on Leibniz's law from fMRI, PET and EEG presentations.

Background: Brain-Mind dilemma is replaced with the inseparable immobile neuronal web wiring matter media through which mobile bmu matter have been processed.

Method: An Internet search for articles displaying measured data obtained from fMRI, PET and EEG pertaining to mind processes via topographical brain was performed. I paraphrased Leibniz's formulae for $bmu = a^3 \times wf/bf/t$, in which 1 bmu is the product of (a^3) 1 mm³ volume of operable basic logic circuit presets with bmu measured from fMRI, PET and EEG multiplied by cfn (coefficient frequency number) obtained from working frequency (wf: bf=cn) to basal frequency (bf) of EEG at awake onset ($8/8=1ncf$) and divided by 1 second, tested from the left frontal lobe at full rest.

Results: Must include: a) identical random sample inclusion, b) identical fMRI+EEG, PET+EEG types of measurements, c) identical mental tasks, d) identical basal data that support life sustenance manipulating mental activation regions. I found no two similar methods out of articles meeting a, b, c, and d criteria.

Conclusion: In practical terms my model may promote a) detection and measurement of specialized webs connectivity or neuronal basic logic circuit presets processing bmu, b) simulation of Artificial Intelligence (AI) and c) creation of a humanoid robot technology based on emulating human biophysical mind qualities.

Keywords: Biophysical mind; Leibniz's law; 1 bmu of human behavior

Introduction

The brain is a self-organized electro-generating system of information-processing evolutionary designed to gather, analyze, reprocess, synthesize, store and execute bottom-top and top-bottom tasks. The brain matter consists of giants neuronal webs netting connectivity loops to be in their relative immobile places, but they have neuronal plasticity potentials to originate new branching, when acquiring extra relevant information properties for the given topic. Hence, these neuronal webs connectivity presents a huge immobile railroad-like network able to extend. In line with and centrally to it, is the mobile information-processing precisely tuning like travelling trains that have been driven from point a to point b,nc and to the end point of destination. As a matter of fact, research articles displayed many approaches in dealing with brain (immobile) and mind (mobile) interrelationship. My literature search has found no article that uses Leibniz's law able to explain a) the intimate nature of both predicates, brain and mind, and b) able offering a way to measure the unit of mind. In this principal trend brain-mind research broadly uses fMRI, PET, and EEG data to provide grounds for the biophysical mind. It could be shown that certain neuronal computer-analog logic circuits may match evolutionary biophysical mind presets. As a concept, both hold common entities resembling computer structured presets [1]. If certain brain regions hold consistent memory repositories of instructions (mind), they may govern mobile mental operations. Therefore both are unique in composition of: a) specialized neuronal logic circuit presets (computer electronic term), b) equivalent biophysical Mind Instrumental Presets (MIP), and c) broad-scale acquired social biophysical-information to be reprocessed into programming levels for optimal survival. The critical point here is that on this basis we may view the brain as a multi distributed neuronal net system that processes coordinated units of external to become internal biophysical information, to be integrally attached to electromagnetic waves and neurotransmitters routes as means of communication. The main point here is that the human mind organizes biophysical information with

programs of inherited and acquired components. However, the field of neuroscience does not provide adequate definitions of how immobile specialized neuronal basic logic circuit presets engage biophysical programs with mobile properties operating with Mind Instrumental Presets (MIP), which coordinate and navigate all mental operations [2,3]. From this point of view there is ample scientific evidence of brain and mind mechanisms that enable to support all faculties of the mind [4]. Based on it, the aim of this article is to bring technological insight related to the onset of external biophysical information-processing that activates given neuronal logic circuit presets to engage dormant MIP into an equivalent synchrony in frequency and intensity in both presets, respectively. This article will clarify:

1. What types of neuronal logic circuit presets most likely have properties similar to computer chips,
2. How neuronal logic circuit presets activate MIP to monitor other mind actions,
3. How outer inanimate optical, acoustic, taste, smell and touch informative units reflected from object and life events are encoded by biosensors and transmitted via distributed parallel electromagnetic waves and neurotransmitters to decoding neurons, linked with neuronal basic logic circuit presets with MIP to self-organize a broad-scale of human programs serving the basics that drive human intelligence,

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4. how Leibniz's law supports the given materialized neuronal logic circuit presets and the materialized biophysical mind instrumental presets, and
5. In what way a biophysical mind unit (bmu) can objectively measure biophysical mind faculties.

Neuronal Logic Circuits Presets

I adopt the computer-like definition of logic circuit presets (5. p.426). Neuronal logic circuit presets are sets of optional neurons positioned in the evolutionary appropriate place within the brain, and designated for specialized mental functions. Each neuronal logic circuit preset uses a given number of ion channel routes and presynaptic neurotransmitter vesicles to convey, in parallel trends, specialized information-processing via dendritic wiring relays (like chips and gates in computers) to predefined destinations. They follow the physical laws of constrained thresholds prescribed by the lower-to-upper thresholds of the homeostatic frames of reference. In short, these neuronal logic circuit presets are basic switching on and off units which process specialize information via activated neurons easily identified either with fMRI+EEG or PET+EEG [5]. Accordingly, these neuronal logic circuits presets have spatial resolution attributes within brain matter. Thus, the brain contains inherited neuronal logic circuit presets located in certain regions that have hereditary rudimentary instructive programs like reacting to hunger, thirst, cold, heat, sounds, eye motions, or uncomfortable outer or inner conditions. Furthermore, they acquire social programs refining them and enriching the instructions of how, in which direction and under which circumstances to run certain types of mental activity [6,7]. Therefore, I conclude that such neuronal logic circuit presets could be called mental neuronal networks. Such mental neuronal networks operate mainly during wakeful states under various body operational ranges. Like electronic chips in computers, neuronal logic circuit presets neither generate thoughts nor contribute to thought comprehension. I accentuate that the description of neuronal logic circuit presets requires fundamental knowledge about computerized hardware-software interdependence. It is of note that the dominant biochemical role in explaining 'how the mind operates' is more generally accepted in medical science than the computer structured presets model. At this point, however, it is beyond the scope of this article to describe the motion of ions via ion channels and the way in which they excite presynaptic vesicles to release an equivalent number of neurotransmitter molecules in order to accomplish the information-processing serving the basis for biophysical mind activity. Different neurotransmitters serve the fundamental role in purifying the biophysical information units and attaching them to their surface media. In this respect it is important to emphasize that since humans possess unique biophysical mind faculties they must have a computer-like ground level (electronic for computers and ionic + neurotransmitters for active neurons) that present the distinct neuronal logic circuit presets, to enable them to carry out these biophysical mind faculties. In addition, I gathered research articles on healthy subjects measuring their emotions, cognition and behavior with fMRI and EEG in bridging brain, mind and behavior [8-10], to promote the understanding of biophysical mind logic circuit presets that monitor all biophysical mind operations [11-14].

Mind Instrumental Presets (MIP)

Mind Instrumental Presets (MIP) are specialized sets of inherited and acquired optional programmed instructions that operate on synchronic frequency and intensity principles equivalent to the frequency and intensity of activation of given neuronal logic circuit

presets. Most, if not all, neuronal logic circuit presets have definite boundaries within which biophysical mind programming instructions have been recorded and kept inertly until they become operable during activation. The central point here is that the logic circuit presets and MIP are inseparable matter entities that complement one another in a linear functional relationship. The core precision here is that size-relate MIP derive from and are linked with activation of the volume of neuronal logic circuits presets in health [15-18]. Under these conditions each MIP must control the function that it is accountable for. Thus, in order to understand the functional role of Mind instrumental presets we must accept the following fundamental prerequisites:

1. Each Mind instrumental preset is evolutionary, recorded and nurtured, and extended to an attached predetermined spatial neuronal logic circuits preset.
2. Each Mind instrumental preset has a crucial biophysical regulatory mechanism to equip a given instruction with voluntary properties for its execution.
3. Each Mind instrumental preset operates during daytime body operational ranges in accord with inner / outer inputs engaging synchronic activation of given neuronal logic circuits presets.
4. Each Mind instrumental preset possesses a unique instructive function identical in nature for all human beings.
5. **Below we Present a Cluster of Universal Mind Instrumental Presets**
 1. Visual illumination panorama- emerging either at awakening with open eyes or from retrieval of previously recorded (imagery) events with closed eyes.
 2. Self-awareness regulation- the common knowledge of sensing out self with ability to know one's presence in a certain place, time and situation.
 3. Emotional experience- the capacity to sense an integrated feeling about one's homeostatic organism to be placed under stress-free conditions.
 4. Perception of objects and life events- the capacity to record optical, acoustic, smell, taste and touch informative units reflected from outer objects and life events applicable to the same culture on identical neuronal logic circuits presets.
 5. Volition- the capacity to execute any one out of many activities to improve one's adaptation and survival function.
 6. Attention vector - the capacity to follow either the dominant input or the voluntarily selected input/output.
 7. Intention vector - the capacity to focus on executing a certain function appropriate to situations, context and timing for basic survival.
 8. Working memory panel - the ability to carry out reasoning (thinking) processes applied to either outer or retrieved inner biophysical information or for both together.
 9. Short-term memory storage- the ability to record and recall either outer or retrieve memorized life events from the recent past, respectively.
 10. Long-term memory storage- the ability to record and recall either external events or to retrieve life events from the far past, accordingly.

First, we consider all these mind instrumental presets (MIP) to be functionally placed in the same segregated neuronal logic circuit presets for all human beings. Second, we consider that each MIP has an inherited structure, shaped by individual nurturing to sub serve a certain mental function. Third, we assume that each MIP has a range of frequency and intensity potentials matching daily loadings within the homeostatic lower-to-upper threshold frames of reference. Fourth, we postulate that each MIP replaces the old concept of 'neuronal centers', because the principal point here is that, it is actually the mind instrumental preset operating inside neuronal logic circuits that carry out any performance and not neurons per se. Fifth, I consider that each MIP cannot operate alone but in combinations. This produces so-called biophysical mind operational levels of formation, presented on a schematic drawing 1.

It is likely that each MIP organization has synchronic pacemaker oscillations potentials to match the requirements of consistency, frequency and intensity. A classical point here to be acknowledged; that this means that at any unit of time at least one of the ion channels pathways will operate when the other is in a refractory period.

Processing and Reprocessing Biophysical Mind Programs

With external biosensors, the sensory system encodes optical, sound, odor, taste and touch senses, from early childhood, and thus informative units evolve into flows of animate biophysical information. The sensory system then further mediates and triggers appropriate presynaptic neurotransmitter vesicles to release a precise number of neurotransmitter molecules. The latter bind themselves with necessary numbers of postsynaptic receptors to purify and refine the stream of information and deliver it to decoding neurons. The critical point here is that it seems reasonable to assume that these decoding input neurons operate with old acquired biophysical programs on a recognition pattern principle. Once identified this information is directed via neuronal associations towards the working memory panel for analysis, interpretation, insight and further reasoning for specific new program construction. This overall repeatable process can take place inside the sphere of short-term or long-term memory storage in regard to the importance of the managed information. The main point here is that all these programs constructions are ruled and regulated with universal Mind Instrumental Presets (MIP). Another crucial point is that by observing human systematic reasoning to perform distinct tasks, the process of which resembles the operation of certain computer programs having a step-to-step (algorithmic) tendency. Similar to computers that provide a) instructions of how to run programs and b) compositions of built-in programs, so the biophysical mind instrumental preset executes self-organized instructions and b) such self-organized programs pile-up life event scenarios to extract from them relevant information to be concisely reprocessed through task-related exercises, optimizing their potentials to sharpen it as a of skill. The most important point here is that actually human reasoning follows the rules of syntax sequence construction and semantics in its performance following rules and regulations of sensory biophysical information recording. This resembles computer-analog programming. Thus, the cardinal point here is that human intelligence is individually shaped by the quantity and quality of acquired programs recorded within the mental brain in the personal-attributed neuronal logic circuits clusters with the assistance of MIP.

Leibniz's Law: Explaining Brain-Biophysical Mind Interdependence

Leibniz, Gottfried Wilhelm (1646-1716) was a German philosopher, mathematician, logician and scientist. He proposed a logic law [known as Leibniz's law (17, p. 336), [his 'principle of the identity of indiscernible', stated that two expressions satisfy exactly the same predicates if and only if they both refer to the same individual]. By advancing brain's structured presets with biophysical mind units especially pertaining to logic, enables to support brain-biophysical mind interdependence [18]. I suggest that Leibniz's law is concerned with 'the principle of the identity of indiscernible' which may well suit the brain areas engaged in biophysical mental or mind operations. Leibniz's law relates to any two similar predicates and searches for mathematical solutions. I applied Leibniz's law to the biophysical mental neuronal logic circuits presets and to the mind instrumental presets. To do so we need to obtain a positive reply on primary question. Is there an allometric relation between the matter structure of neuronal logic circuits presets and the information structure of biophysical mind instrumental presets? The prominent point here is that current neuropsychiatric knowledge shows a relation exists and encompasses only brain areas intimately linked with mental neuronal networks via which biophysical mind operations have been processed. Second, if we receive a positive answer to the first question then a positive reply to the second question will advance our understanding in using both principles of Leibniz's law in regard to brain-biophysical mind interdependence. Do biophysical mind instrumental presets precisely follow the neuronal logic circuits activation to satisfy both principles of Leibniz's law? The central point here is that biophysical MIP equivalently responds to activated neuronal logic circuits presets to display an interrelated synchrony in the brain space, time, frequency and intensity of oscillations. This enables reference of both presets conditions to the same foundation and complies with both principles of Leibniz's law. Mathematically, due to Leibniz's law one may reasoning like:

'Principle I is covered by the universal quantifier function in which the predicate calculus function is expressed as follows: $(\forall a \text{ } \forall b) a=b$.

This principle I of the identity of indiscernible states that two expressions (neuronal logic circuits presets and biophysical MIP satisfy exactly the same predicates [(a) oscillating in regional ion channels of mental neuronal networks and (b) carrying synchronic informative units in these streams of oscillations to compose biophysical mind instrumental preset instructions that complement one another, if and only if they both fulfill the same wakeful condition within homeostatic body operational ranges of the same subject.

'Principle II is covered by a weaker indiscernibility of identicals stating, that if $a=b$ [(a) the relevant activate neuronal logic circuits presets (b) matched the biophysical mind instrumental presets integrally attached to these given streams of oscillations], then whatever is true of a is true of b. As was indicated above, neuronal logic circuits presets are immobile entities, however their ions with attached to them information units become mobile entities. Thus, the two are integrated in one unifying function like software with hardware or trains with railroads. The main scientific merit of Leibniz's law in the brain-biophysical mind interdependence is that it holds true at least for parts of the brain which are engaged in mental activities.

Biophysical Mind Unit Definition and Measurement

Below is proposed a physical index for biophysical mind unit measurement:

The biophysical mind unit (bmu) is obtained from an expression: $bmu = a^3 \times wf/bf/t$, in which 1 bmu is the product of (a^3) 1 mm³ volume of activated basic logic circuit presets with biophysical MIP measured using fMRI + PET + EEG multiplied by 1f (wakeful frequency [wf:bf] basal frequency of EEG at awake onset equals 8 oscillations (8/8=1 coefficient frequency number) [cfn] and divided by 1 second (t), tested from the left frontal lobe when awake at task-free rest comfortable condition [19]. For learning paradigms I present measurements of mind at its initial awake rest state that is schematically depicted on Figure 2 (A) shows different pulse and EEG levels under different body operational ranges. Second, it Figure 2 (B) shows various quantities of activated neuronal logic circuits that provide different mind unit numbers. Third, by using cut off points we may measure each active program running in (a^3) 1 mm³ volume of logic circuits presets (brain) proportionally to eight Body Operational Ranges (BOR) or behave like

that with loading velocity defined by EEG in 1 second. It's common knowledge [20] that at wake state begins with BOR stage 5 at rest loading, in average having from 8 to 12 oscillations. The least number of basal resting state equals 8 oscillation per 1 second. At BOR stage 6 under minimal loading has 13 to 25 oscillations per 1 second. At BOR stage 7 under moderate loading has 26 to 50 oscillations per 1 second. And at BOR stage 8 under maximal loading has 51+up oscillations per 1 second.

At resting state the working EEG oscillations should be divided on 8 basal oscillations by 1 second. Hence, let me introduce two examples. First, a person at rest displays 8 working oscillations that equals with 8 basal oscillations per 1 second. In this case the given expression equals: $wf:bf = 8:8 = 1$ cfn. Second, a person is at maximal loading displaying 80 oscillations per 1 second to be divided on 8 basal oscillations. This

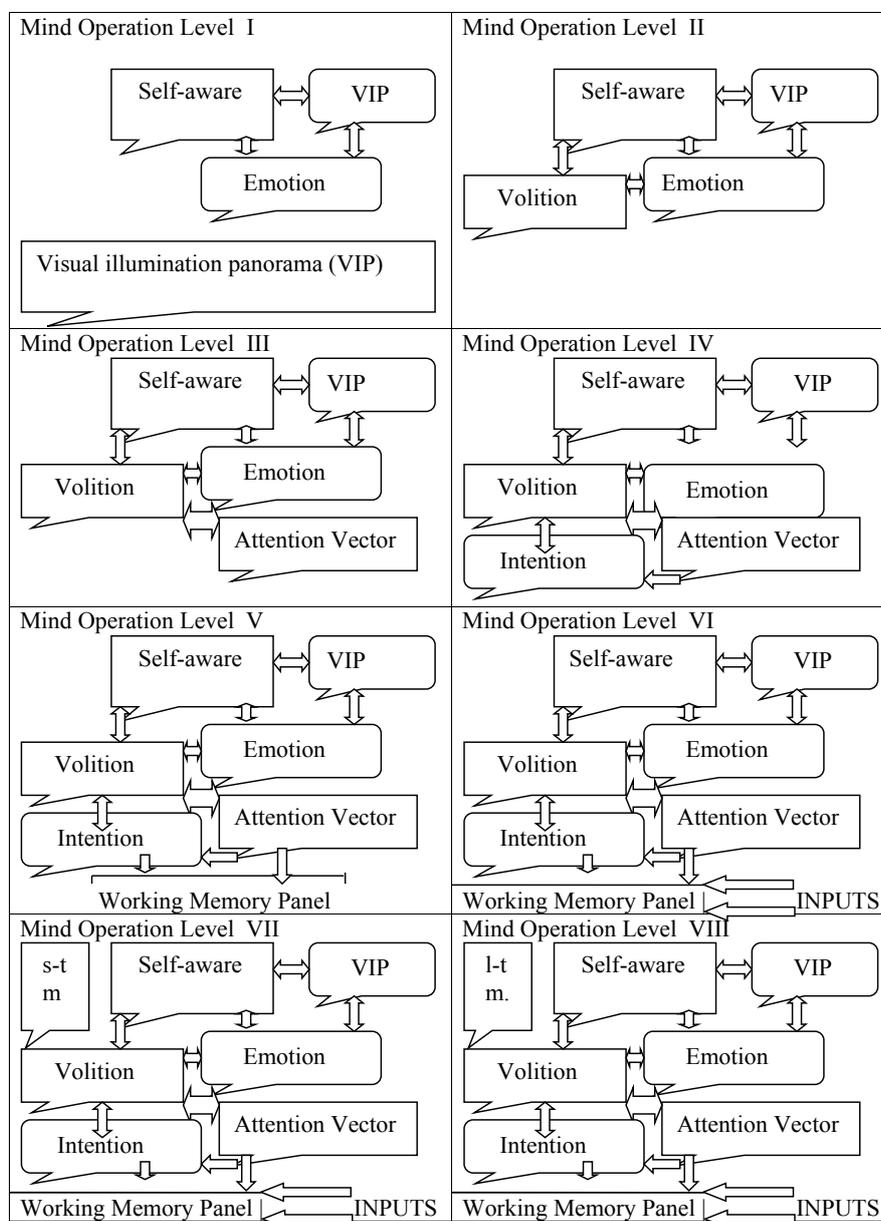


Figure 1: A Schematic Computation of Biophysical Mind Operational Levels.

expression equals 80: $8=10$ cfn. Since a biophysical mind unit is a macroscopic entity that derives from and is associated with informative units to be attached to oscillating logic circuits placed in the brain volume a^3 and having a distinct (wf) wakeful frequency, we may describe this phenomenon with a mathematical formula. This mind effect is a unique unit to be labeled (bmu)- biophysical mind unit. The formulae for $1bmu=1a^3 \times 1wf$: $1bf : 1s$. $1bmu$ is a function of oscillating in $1mm^3$ volume of logic circuits of the brain to the ratio of $1f$ awake frequency in 1 second. For the above 1st example, the given individual's mind at resting operational level at awakening has the lowest common denominator for the synchronic biophysical mind. It includes the visual illumination panorama, self-awareness and emotion functions in three pacemakers (Figure 1), $bmu = 3a^3 \times 1cnf = 3$ bmu. In contrast, in the 2nd example will have, $bbmu = 3a^3 \times 10cnf = 30$ bmu. Like other physical units of measurements, these bmu are of practical importance for identification of the number of active spatial brain regions with

synchronic biophysical mind instrumental preset functions. Their frequency in 1 second is a standardize unit based on standardize wakeful resting state. It seems logical, the higher the EEG oscillation rate is the higher the bmu quantifying expressions are relating, respectively. Under these basic preconditions, one may offer calculating the mental invest effort (mie) in 1 minute for solving standardize goal-oriented task in health and pathology. Such calibration should enable fostering personal solving-problem levels with mie numbers, employing them for comparison and prediction.

Conclusion

Irrespective of how many articles on fMRI, PET alone or in combination with and EEG depicting and describing operable cognitive, emotional and behavior manifestations, one would lack of, in field operable unifying measuring applications. Thus, at least Leibniz's

Pulse Day Loading Expressions	EEG Day Loading Expressions
a) at rest loading = 60 – 70 pulse beats per minute	a) at rest loading = 8 – 12 oscillations per second
b) at minimal loading = 71 – 80 pulse beats per minute	b) at minimal loading = 13 – 25 oscillations per second
c) at moderate loading = 81 – 100 pulse beats per minute	c) at moderate loading = 26 – 50 oscillations per second
d) at maximal loading = 101 – 130 pulse beats per minute	d) at maximal loading = 51+ up oscillations per second

Figure 2(A): Schematic Neuronal Logic Circuits Presets and Mind Instrumental Presets

a) at rest loading	c) moderate loading
***** a1 00000000000000000000000000000000 a2 00000000000000000000000000000000 a3 00000000000000000000000000000000 a4 00000000000000000000000000000000 a5 00000000000000000000000000000000 a6 00000000000000000000000000000000 a7 00000000000000000000000000000000 a8 00000000000000000000000000000000 a9 00000000000000000000000000000000 a10 00000000000000000000000000000000 a11 00000000000000000000000000000000 a12	***** a1 ***** a2 ***** a3 ***** a4 ***** a5 ***** a6 ***** a7 ***** a8 00000000000000000000000000000000 a9 00000000000000000000000000000000 a10 00000000000000000000000000000000 a11 00000000000000000000000000000000 a12
b) at minimal loading	d) at maximal loading
***** a1 ***** a2 ***** a3 ***** a4 00000000000000000000000000000000 a5 00000000000000000000000000000000 a6 00000000000000000000000000000000 a7 00000000000000000000000000000000 a8 00000000000000000000000000000000 a9 00000000000000000000000000000000 a10 00000000000000000000000000000000 a11 00000000000000000000000000000000 a12	***** a1 ***** a2 ***** a3 ***** a4 ***** a5 ***** a6 ***** a7 ***** a8 ***** a9 ***** a10 ***** a11 ***** a12

Figure 2(B): Schematic Neuronal Logic Circuits Presets and Mind Instrumental Presets.

Note: ***** an activated row of ion channels (active neuronal logic circuits preset)
 00000000000 deactivated row of ion channels (inactive neuronal logic circuits preset)

law allows to base on personalize neuronal webs connectivity through which mobile biophysical mind units [bmu] have been processed in a unit of space and time, meeting the double predicates of the 'identity of indiscernible' parameters. The main point here is that the bmu are processed by the speed accelerating or speed decelerating physiological processes occupying fractions of regional brain space. Hence, such operational claim of discrete bmu processed via neuronal webs connectivity interdependence may hold the fundamental rule in their unity:

- There must be the universal spatial resolution for all universal biophysical mind instrumental presets.
- There must be personalize shaped biophysical cognitive-emotional-behavior task-oriented survival programs [21,22].

The main practical point here is that activated bmu through neuronal logical presets determine physical boundaries of both presets in synchronic operation. And another supreme point here is that it sets new horizons for artificial intelligence and it may boost emulation of human-like computerized programs and in robots.

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