Has AI Hit a Dead End?

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Abstract

95 per cent of brain activity has been found to be fluctuations seemingly unrelated to conscious activities involving sensory perception, motor actions and cognition. In the neuroscience framework they are interpreted as noise. Since fluctuations are poison for deterministic computation, the finding poses a serious problem for model of the brain as a deterministic classical computer.

In this article the TGD based interpretation of the long range fluctuations as quantum fluctuations characterized by the value of the effective Planck constant $h_{eff} = nh_0$ labelling the phases of ordinary matter identified as dark matter and residing at magnetic body (MB) of the system is discussed. n has number theoretic interpretation and can be regarded as a universal IQ so that fluctuations are a prerequisite for intelligence. According to the TGD based view about neuroscience primary sensory percepts reside at the sensory organs which requires back and forth communications between brain and sensory organs to build sensory perceptions as standardized mental images. These communications must be fast and the proposal is that they use dark photon signals.

In this view nerve pulses do not represent signals inside the brain but act as neural relays at synaptic junctions making possible long range dark photon communications inside the brain. Part of the metabolic energy associated with the fluctuations could be used to the building of mental images in the proposed manner. Nerve pulse patterns generate Josephson radiation communicating sensory information to MB and also require metabolic energy. Dark cyclotron radiation from MB represents control signals to the brain. In both cases, long range fluctuations at brain level are involved.

1 Introduction

I found a link to a very interesting article titled "Artificial intelligence research may have hit a dead end" followed by the comment "Misfired" neurons might be a brain feature, not a bug — and that's something AI research can't take into account" (https://cutt.ly/bbO1YVN). Also Philip K. Dick's 1968 sci-fi novel, "Do Androids Dream of Electric Sheep?" is mentioned (https://cutt.ly/ibPaTpc). Would an intelligent robot (if it were still a robot) dream?

AI models the brain as a deterministic computer. Computer does not dream: it does just what is needed to solve a highly specialized problem (just what a top specialist does in his job; computer is the idol of every professional highflier).

Computerism assumes physicalism denying such things as genuine free will but this is not seen as a problem. Also the mainstream neuroscientist believes in physicalism. Some computational imperialists even claim that physics reduces to computerism.

What might be called neuroscience of fluctuations has however led to a strange conclusion: 95 per cent of brain's activity and therefore metabolic energy seems to be used to generate fluctuations, which in standard neuroscience represents noise (amusingly, junk DNA corresponds to 95 per cent of DNA in the case of humans, as noticed in the article). Neuroscientists have routinely averaged out this "noise" and concentrated on the study of what can be regarded as conscious activities: sensory input, motor actions, and cognition. These contributions seem to represent only ripples in a vast sea of activity. The brain thus seems to be diametrically opposite to a computer in the sense that spontaneous fluctuations are poison for a computer but food for the brain. This conflicts with the views that AI will replace natural intelligence with decade or two (`https://cutt.ly/sbPaMQH`).

Also EEG is still regarded often as a mere noise. One can however wonder why the brain would use a lot of metabolic energy to send information to outer space: coding of information about contents of consciousness and brain state indeed requires a lot of metabolic energy.

The book "The Oxford Handbook of Spontaneous Thought: Mind-Wandering, Creativity, and Dreaming" (`https://cutt.ly/EbPf51i`) [J1] discusses the problem where spontaneous thoughts and ideas come from.

The interpretation of the long range fluctuations as fluctuations induced by long range quantum fluctuations characterized by the value of the effective Planck constant $h_{eff} = nh_0$ labelling the phases of ordinary matter identified as dark matter and residing at magnetic body (MB) of the system is one of the basic idea behind TGD inspired quantum biology and model of the brain [L18]. In adelic physics [L3, L4] n has a number theoretic interpretation and can be regarded as a universal IQ so that fluctuations are a prerequisite for intelligence.

TGD inspired theory of consciousness and life relies on zero energy ontology (ZEO) predicting among other things that time reversal occurs in ordinary state function reductions [L8]. Second law is replaced in ZEO with negentropy maximization principle (NMP) implying second law for the ordinary matter. ZEO combined with adelic physics predicts that evolution and biological self-organization are unavoidable. The possibility of time reversed dissipation predicts an apparent breaking of second law [L7, L15] .

According to the TGD based quantum view [K1, K4, K3] about neuroscience, primary sensory percepts reside at the sensory organs which requires back and forth communications between brain and sensory organs to build sensory perceptions as standardized mental images. These communications must be fast and the proposal is that they use dark photon signals.

In this view, nerve pulses do not represent signals inside the brain but act as neural relays at synaptic junctions making possible long range dark photon communications inside the brain [L2] . Part of the metabolic energy associated with the fluctuations could be used to build of mental images in the proposed manner. Nerve pulse patterns generate Josephson radiation [K3] communicating sensory information to MB and also require metabolic energy. Dark cyclotron radiation from MB represents control signals to the brain. In both cases, long range fluctuations at brain level are involved.

2 TGD interpretation of the findings

It is interesting to discuss the above described findings from TGD perspectivbe.

2.1 Could fluctuations be induced by quantum fluctuations in quantum critical Universe of TGD?

Consider first the TGD based identification of the origin of the fluctuations and their interpretation.

1. TGD Universe is quantal in all scales. Zero energy ontology (ZEO) [L8, L6] allows to overcome the basic objection that the universe looks classical in long scales: ZEO view about quantum jumps forces the Universe to look classical for the outsider. The experiments of Minev et al [L6] indeed demonstrated this concretely [L6].

2. TGD Universe is also quantum critical in all scales: this assumption fixes the basic coupling parameters as analogous to critical temperature in thermodynamics. Quantum criticality

means that the system is maximally complex and sensitive for perturbations. Complexity means that the system is ideal for representing the external world via sensory inputs. By criticality implying maximal sensitivity it is also an ideal sensory receptor and motor instrument.

3. The basic characteristic of criticality are long range fluctuations. They are not random noise but highly correlated. Could the fluctuations in the brain correspond to quantum fluctuations.

Long range quantum fluctuations are not possible for the ordinary value of Planck constant.

Number theoretical view about TGD [L3, L4], generalizing ordinary physics of sensory experience to the physics of both sensory experience and cognition by introducing besides real numbers also p-adic number fields and their extensions, leads to the prediction that there is infinite hierarchy of phases of ordinary matter identifiable as dark matter and labelled by the values of effective Planck constant $h_{eff} = nh_0$, where n is dimension for an extension of rationals defined by a polynomial determining space-time region. The most revent view about the concrete realization of this picture in terms of $M^8 - H$ duality is discussed in [L9, L10, L11, L14]. The value of n serves as a measure for algebraic complexity and therefore defines a kind of IQ. The longer the scale of quantum fluctuations, the higher the value of n, and the larger the h_{eff} , and the longer the scale of quantum coherence. Fluctuations would make the brain intelligent. Their absence would make the brain a complete idiot - an ideal computer. The higher the value of h_{eff}, the larger the energy of the particle when other parameters are kept as constant. This means that intelligence requires metabolic energy feed to increase h_{eff} and keep its values the same, since h_{eff} tends to be spontaneously reduced.

One can however argue that since the brain consists of ordinary matter, brain fluctuations at this level cannot be quantum coherent in long scales.

3. In TGD they would be induced by quantum fluctuations at the level of the magnetic body (MB) having a hierarchical onion-like structure [K6, K5, K2]. The dark matter would be ordinary particles with $h_{eff} = nh_0$ at MB and since n serves as a measure of IQ it would be higher for dark matter than for ordinary biomatter. MB containing dark matter would be the "boss" controlling the biological body (BB).

2. The quantum coherence of MB would force ordinary coherence of ordinary biomatter as a forced coherence. Ordinary matter would be like soldiers obeying the orders and in this manner behaving apparently like a larger coherent unit [L7].

MB would receive sensory input from BB and control it by using EEG realizes as dark photons. This would explain EEG and its probably existing scaled variants.

2.2 TGD view about sensory perception, motor actions, and dreaming and imagination

The proposal of the article (`https://cutt.ly/bbO1YVN`) was that most of the brain activity consists of "dreaming". Dreaming, hallucinations, and imagination are poorly understood notions in neuroscience. TGD provides a rather detailed view about these notions [L2].

1. What distinguishes TGD from neuroscience is that sensory receptors - rather than brain - are assumed to serve as carriers of sensory percepts so that brain would build a cognitive representation by decomposing the perceptive field to objects and give them names.

   Zero energy ontology (ZEO) [L8, L15] providing a new view about time and memory makes it possible to solve the basic objections related to the phantom limb phenomenon: pain in the phantom limb would be sensory memory. Sensory memories can be indeed stimulated by electrically stimulating temporal lobes and the memory feats of idiot savants could rely on sensory memories involving no abstraction. ZEO also provides a new view about self-organization in which dissipation with a reversed arrow of time plays a fundamental role [L8, L7, L18].

2. The assumption that sensory percepts are artworks [L2] rather than passive records of sensory input requires a virtual sensory input from the brain to sensory organs and build-up of the final percept by pattern recognition - an iterative procedure involving very many forth-and back signals. Nerve pulse transmission is quite too slow a process to allow this and signals propagating with maximal signal velocity are suggestive.

3. Nerve pulses and neurotransmitters would not represent real communication but give rise to temporary intra-brain communication lines along which dark photon signals would propagate with the maximal signal velocity using dark photons (characterized by $h_{eff}/h_0 = n$) transforming to biophotons in an energy conserving manner. As a matter of fact, the communications could be rely dark 3N-photons defining representations for genes. Gene represented as a sequence of dark 3-photon triplets- codons - would serve as an address and modulation of the scale of frequencies would code for the message generating a sequence of 3N-resonance peaks at the receiving end [L1, L5, L12, L16, L17]. This also leads to a far-reaching generalization of genetic code [L13].

   Neurotransmitters and also other information molecules (hormones, messenger molecules) attached to receptors would serve as bridges fusing permanent but disjoint communication lines along axons to a connected temporary communication line for dark photons to propagate. Nerve pulses would also generate generalized Josephson radiation allowing communications between biological body (BB) and magnetic body (MB) using EEG [K1, K4]. Meridian system could be a permanently connected system of communication lines.

   This picture leads to a concrete proposal about the roles of DMT and pineal gland concerning imagination and dreams and hallucinations [L2].

The natural question is following: How large fraction of the spontaneous activity which forms 95 percent of brain activity goes to the feedback not present in the brain of the standard neuroscience? This would include the construction of the feedback to sensory organs as virtual sensory inputs to build standardized mental images. Dreams are a special case of this. There is also the virtual sensory input which does not reach sensory organs and gives rise to imagination, in particular internal speech.

Similar picture applies to virtual motor input and the construction of motor output as "standardized motor patterns" - this notion makes sense only in ZEO since the patterns are 4-D. Note that the feedback loop could extend from brain to MB.

There is an interesting finding related to the "noise" and motor activities as the popular article "'Noise' in the Brain Encodes Surprisingly Important Signals" published in Quanta Newsletter (`https://cutt.ly/ebA1FLm`) tells. In the experiments made for mice it is found that the spontaneous brain activity increases dramatically as the mouse moves. This brings in mind a lecturer who moves forth and back as he talks. This rhythmic motion could give rise to a brain/body rhythm coupling the lecturer to a layer of MB with large h_{eff} . Its quantum coherence of MB would induce ordinary coherence of BB in body scale and with large h_{eff} and raise the "IQ" of the lecturer. Creative thinking requires movement and is not possible in backwater!

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