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Internet of Things as a Methodological Concept

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***Abstract*—Nowadays, we are witnessing formation of a new technological marvel: Internet of Things. This construction is able to combine in a particular operational entity all the bits and pieces of the world around us. Thus, why could not this unique establishment present the long-sought essence in the Nature of Things? The two pillars of modern fundamental science—relativity and quantum mechanics—are just approximate descriptions of some properties of such a constructive possibility. The machinery of the physical world develops on a cellular automaton model employing as the transformation rule the mechanism of distributed mutual synchronization with the property of fault-tolerance. This infrastructure yields traveling wave solutions that exactly correspond to the spectrum of the stable elementary particles of matter with an upper bound on the propagation speed. On top of the considered cellular automaton infrastructure there appears a secondary formation that constitutes the mechanism of the Holographic Universe that is the basis for the Internet of Things. The holographic activities determine all the quantum mechanics properties of the physical world including the nonlocality entanglement. For living systems the arrangement of the Internet of Things elucidates the most puzzling biological capability of morphogenesis that otherwise cannot find any reasonable explanation. In this paper, we present the world view of internet of things and the application of this methodology from geospatial computing to physics. We give specific details on applying IoT concept to geospatial analysis in various fields from agriculture to medicine. We also provide detailed analysis of the profound impact of internet of things on our physical world which is a vital knowledge when it comes to geospatial research. We present calendar variation of quantum world which can be used for geospatial data gathering by fine tuning the equipment based on the time of the year.**

Keywords*—*Internet of Things (IoT); geospatial IoT; holographic mechanism; cosmic microwave background;

I. Introduction

Internet of Things is a construction that combines information and energy processes to control very large collections of different objects. In this respect, such a formation can be used as a model of the physical world to regulate the movements of all myriads of elementary constituents of matter and their aggregates. Of decisive significance is the fact that this model incorporates the processes of morphogenesis. This model provides information signals and energy impacts naturally implementing morphogenesis as 3D printing. The ability to create a tremendous variety of biological formations is the main attribute of Nature. In traditional science this morphogenesis does not find a convincing explanation [1]. The operational facilities of the surmised construction of the Internet of things comes out of a cellular automaton infrastructure of the physical world, on top of which develops the all-embracing mechanism of the Holographic Universe [2], [3].

The internet of information sources revolutionized the way we communicate in the world. The information sources and the humans are always connected through internet. In addition to connectivity anytime and any place for anyone, we will soon have another dimension in the world of information and communication technologies: connectivity for anything [4]. The Internet of Things does not have a singular definition. One definition is "Things have identities and virtual personalities operating in smart spaces using intelligent interfaces to connect and communicate within social, environment, and user contexts". Another is "Interconnected objects having an active role in what might be called Future Internet" [5]. It is a technological revolution and embodies the future of computing and communications.

The IoT may be more appropriately referred to as the Internet of relating to things. But where the "things" are actually information about things (meta data). We then can say "the semantic meaning of Internet of Things is the Internet relating to information of things, and the 'relating to' in it is to say thing's information flows rationally and orderly on the Internet, for being shared on a global scale". Radio Frequency Identification (RFID) is a very important facilitator of IoT. RFID uses radio waves to identify items so that they can be connected [6]. RFID also provides a means of tracking items in real-time, providing location and status information. It is widely used in retail, health-care, and facilities management [7]. To bridge the gap between the physical and information worlds, sensors collect data from the environment, providing information necessary for the proper responses to be formulated. Miniaturization and nanotechnology within the "things" or "smart devices" allows the information to be processed and independent decisions and responses to the data can be made. Embedded intelligence in a thing (e.g., the washing machine controller makes the machine work through a wash cycle) allows it to function alone but in order to work interact with another thing, connectivity is required. This connection is primarily wireless and some ways to connect things are: RFID, DSL, GPRS, WiFi, LAN, 3G, to name a few. In order to communicate however, smart things must be able to also "process information, self-configure, self-maintain, self-repair, make independent decisions, [and] eventually even play an active role in their own disposal". This will change communication from human-human to human-thing to thing-thing.

A Coordination Layer within the IoT architecture is proposed which would "process the structure of packages from different application systems and reassemble them to an unified structure which can be identified and processed by every application system". *Tan, et al.* [8] states that specific application

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solutions will be one of the most important engines of the innovation and development of the IoT. It is application driven. Further they ascertain that without clear and recognized standards, the IoT cannot be real (reach a global scale). In addition, security and privacy is a main concern and without them, public acceptance of the IoT will not happen. The internet was introduced as a global network, connecting computers with services such as the World Wide Web. In recent years, social media and networking services such as Facebook and My Space, along with exponential growth of mobile internet access has transformed the internet of computers into an internet of people, where content is created and absorbed by people (e.g., blogs, websites like Wikipedia). Technological advances continue to stretch the boundaries of the internet, providing inexpensive and ubiquitous connection all over the world, even in less developed areas. As we move forward towards a society that is "always connected" through copious amounts of available networks (wired and wireless), the concepts of the future of our internet ("Future Internet") and the associated "Internet of Things" emerge to describe the concept of connecting the world's objects in both a sensory and intelligent manner.

The "Internet of Things", or IoT, is made up of "smart" objects such as today's mobile phones, tablets, alarm systems, home appliances and industrial machines that are always connected to the internet. In the near future they will all be always connected to each other through an internet of networks. "Smart" objects also include things that are tagged with RFID tags and barcodes used for tracking purposes. Scanners could identify and communicate the objects and their location information. Middleware and frameworks could facilitate the development of application and service, adding intelligence and thus resulting in better services. The scale of the IoT could reach billions of interconnected things, all providing data, and many capable of performing actions based on the information it or others provide. More intelligent services could be created to further improve decision making and appropriate action taking. The applications developed are the major force driving the future of the IoT. In this paper, we give an insight into the internet of things as a methodological concept where it can be used as a basic underlying principle of any design, algorithm and structures.

II. Internet of Things in Technology

Zillions of all of the entities of the world from mobile devices to human beings are integrated into an interacting community providing control and actuation through internet. When people interact through social networks, they can solve important problems faster than any other computer can do and this "Internet of People" becomes a super brain to solve time-critical problems. A group at MIT was able to find the geospatial coordinates of ten balloons randomly deployed in the US in under 9 hours by leveraging social media and smartphones [9]. The network operated in way that each entity in the network is rewarded when he/she recruits their friends to find these balloons, hence creating a massive "internet of people" which can act as a single entity (like brain) to solve the problem faster. The methodology of internet of things is widely used in data loss prevention of wireless and mobile ad-hoc networks. By communicating and interacting with other devices in the network, one of the important problems in mobile ad-hoc networks—data loss—can be solved. A new network architecture and local-information exchange protocol has been introduced in [10]. In this network, each device is interconnected and communicates with other devices in the network to keep them updated about the status of its data: Corrupted or no errors. In security mechanisms, internet of devices acts as single security entity which communicates and updates its status to the neighboring devices. If there is any security breach in one single device, then the network is flooded with an alert about the compromised device thus ensuring other devices to stay on the lookout for an attack and protect it from node compromising attacks.

A. Geospatial Data Collection and Analysis

Thousands of satellites and millions of sensors collect geospatial data around the world. According to our recent study [11], several variations occur on earth like changes in radioactive decay rates, changes in energy levels (Lamb's shift), and Josephson tunneling based on the earth's (or solar system's) galactic coordinates in space.

$$\textit{Quantum Mechanics (February)} \neq \textit{Quantum Mechanics (August)}$$

These variations could be revealed to affect the geospatial variables around the globe. The enormous and unexpected power of the hurricane Sandy which hit the north east coast of the United States on October 22, 2013 is an example of the uncertainty of geospatial variables. The hurricane created enormous and powerful ocean waves which created seismic waves across the United States [12]. The National Cancer Institute promotes the idea of understanding geospatial factors in cancer research. Our idea of calendar variations give a proper explanation of variation in radioactive decay rate. It may be a worthy contribution to geospatial data gathering for cancer research. For example, the geospatial data gathering instruments can be adjusted to warn and record the radiation levels in a particular area based on the month of a year. So understanding the quantum mechanics based on calendar variations becomes vital to the proper gathering of geospatial data around the world. Parameters like energy levels and radioactive decay rates not only affect the instruments but the geospatial location itself. By creating the internet of geospatial sensors and satellites, we can classify the patterns of geospatial variations connected to quantum mechanics. For instance, scientists have launched a global internet of robots called Rapyuta which is an online internet database "to help them cope" with the confusing and complex behavioral models of humans [13] [14] . Instead of building their own database of solutions to the complex human behaviors and tasks, they can simply question the Rapyuta database to get the solution if they stumbled upon a task that they have never done before and has not stored the solution in their database. This Rapyuta repository is built on a cloud and each robot from every corner of the world can update their solutions for a particular problem to the repository. For example, if a robot knows a mechanism to deal with a particular object in a specific location in the world, that mechanism can be used by another robot which is on the other corner of the world and never dealt with the same object before. The on-board computation which reduces the mobility and increases the computation cost can be

eliminated or reduced significantly with this internet of robots methodology.

Another important technological marvel is "internet of crowds" also known as crowdsourcing. Collecting information from the crowds (group of people connected in the internet), aggregating and analyzing that information for solving important problems in recommendation systems and e-commerce systems. Crowds not only provide the data but also involve in real-time correction and checking on the input data coming from others like online watch-dogs. For example, if a novice user is contributing to the system, they can be monitored and corrected by the experienced expert in the crowd. It is not only reduces errors in the underlying system, it also educates the new contributors and prevent systems from wrong input data which might jeopardize the system [15].

B. 3D printing and self-replication of molecules

The organization of the physical world as an Internet of Things allows Big Data configurations produced not just for informational structures but for material constructions as well. The former are being developed through joining the Cloud Computing process, while the latter making use of quantum mechanics provide what can be called quantum "3D printing". For example, NASA is funding a research project to construct a new 3D food printing machine [16]. Just like ink cartridges, the 3D food printer will have powders and oils containing all the life-supporting nutrients as cartridges. Thus, an impact of information signals on material activities is exercised in synapses gaps where the propagation of electrochemical pulses in axons and dendrites continues by chemical neurotransmitters. This way neural activity inside the brain can be modulated by the information control from the outside extracorporeal memory.

A vital Big Data operation in living systems is self-replication of macromolecules. This is largely related to the creation of proteins in morphogenesis and metabolism. The regular way of protein production according to the Central Dogma of molecular biology: DNA—mRNA— protein is not sufficient. Two main reasons can be pointed out. First, it is not feasible to have bulkiness fabricated step-by-step. And second, in many circumstances the proteins are to be exactly reproduced with their folding structures, like prions in the case of "Mad Cow disease". The Big Data malfunctions associated with protein reproductions constitute for the brain "hardware" problems—neurological diseases, while above mentioned disruptions associated with the creation of contextual background constitute for the brain "software" problems—mental disorders.

The suggested procedure of self-replications of macromolecules is depicted in Fig. 1. It is based on our interpretation of quantum mechanics behavior as a result of interactive holography [17]. The involvement of the holographic mechanism directly exposes the dominant quantum property of nonlocality that otherwise appears inconceivable. The specifics of the quantum mechanics behavior are essentially determined by the interaction of two entities: the actual particles and their holographic feedback images. It has been shown that quantum transitions as random walks of these entities are described by Schrdinger's equation. The imprecision in localization of a particle between actual and virtual entities leads to the fundamental quantum principle of uncertainty. In relation to macromolecules this produces mesoscopic displacements of their components that leads to an effective algorithmic procedure for reproduction of the "Big Data" structures. The facilities for self-reproduction possibility of macromolecules should reveal new yet not recognized properties of the physical world as anticipated by P.L. Kapitsa [18]. The surmised algorithm for self-replication of macromolecules develops by means of swapping of particles with their holographic placeholders as illustrated and explicated in Fig. 1. The suggested self-replication algorithm can be figuratively imagined as "Xerox" copying.

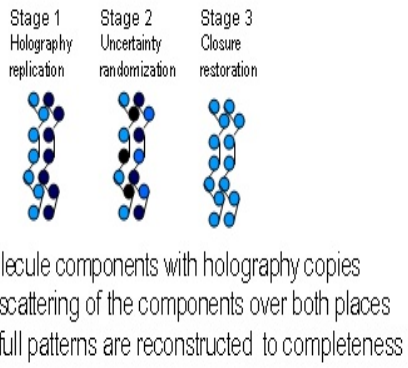

Fig. 1. The Algorithm for Reproduction of Macromolecules

C. Joining the cloud and mental disorders

Let us consider how human memory could be amassed with the Big Data. Human brain contains about 10^{11} neurons and 10^{14} synapses. It is believed that updates of the synapses somehow develop the contents of human memory. Let us assume that chemical processes associated with one update take 1/100 *sec*. So, getting one update at a time would lead to formation of the whole system of synapses in about 30,000 years. Thus, assuming that a child of 3 years of age acquires a system of synapses, which is in essence prepared, this system should have been continuously reorganized with the pace of 10^6 updates per second.

In terms of algorithmic effectiveness, formation of a Big Data memory structure by individual updates, even performed in parallel, does not appear feasible. In our conception of the physical world as an Internet of Things the problem of the formation of biological memory is efficiently resolved in a simple way with much less time and effort. This can be achieved merely by joining the holographic Cloud. The required updates of the Cloud contents are done at the pace of the repetition rate of the holography reference beam—10^{11} Hz. The information substance obtained from the Cloud basically constitutes the background context for the Big Data computational model. Evolution of this context while transferring from one generation to the next one is a conservative process. For good or for worse, the core of this context—paradigms, habits, myths, morality, etc.—cannot undergo rapid transformations.

This context changes slowly. In a sense, the fact of contest conservatism keeps up with the von Neumanns saying: ”It is just foolish to complain that people are selfish and treacherous as it is to complain that the magnetic filed does not increase unless the electric field has a curl. Both are laws of nature”.

Possible disruptions of the considered process for acquiring the context background for newly developed organism can result in mental disorders, like neuroses, schizophrenia, and autism. In most cases of such disorders changes in the physical constituents of the brain are insignificant. So, it is a software rather than a hardware problem. Various details associated with the considered mental disorders seem to corroborate our hypothetical scheme of their origin. First, let us start with the issue of heredity. The article [19] reports a sensational observation that ”older men are more likely than young ones to father a child who develops autism or schizophrenia”. The study found that ”the age of mothers had no bearing on the risk for these disorders”. The explanation of this observation implicates ”random mutations that become more numerous with advancing paternal age”. It is questionable that the alleged mutations occur at random because of the doubts why should these mutations target specifically mental disorders. In our concept, the amount of the holographic layers accumulating the father’s life information increases with father’s age; so when this information is used to create the context background for the newborn child it might encounter more disruption influences. Also, the suspected transgeneration epigenetic influences on autism could be related to the same surmised mechanism for the context background formation. Very surprisingly, as indicated in [20], ”The mental health of a child’s mother during pregnancy is widely considered a risk factor for emotional and behavioral problems later in the child’s life. Now a new study finds that the father’s mental health during the pregnancy also plays a role.”

More than 500 genes have so far been implicated in autism showing that no clear genetic cause will be identified [21]. Thus, it is vital to look at the role of the environmental factors. Babies exposed to lots of traffic-related air pollution in the womb and during their first year of life are more likely to develop autism, according to [22]. In our view, nanodust affecting DNA conformational oscillations, and, hence, their communicating facilities, changes the context background. Finally, let us turn our attention to some possibilities of recovery as reported in [19] ”Doctors have long believed that disabling autistic disorders last a lifetime, but a new study has found that some children who exhibit signature symptoms of the disorder recover completely”.

III. Physics related to Internet of Things

The worldview of modern science does not explain the major point in the Universe - the phenomenon of Life. Physics is a branch of knowledge treating the inanimate world, and ”there is nothing in the known laws of physics to compel matter to organize itself into life” (P. Davis). Moreover, ”how memories are stored in the brain is not likely to be affected by the discovery of the final theory” (S. Weinberg). So, what is the meaning of a road if it does not lead to shrine? Physical science that cannot explain biology is not just incomplete, it is wrong. With the concept of the Internet of Things everything is illuminated: Infrastructure is Life. Apart from lofty esoteric allusions, this approach raises two groups of concrete questions: (1) how the physical world can be implemented within the scope of the Internet of Things and (2) how this theoretical construction can be verified. The answers go as follows.

The Internet of Things representing the physical world builds up atop of a cellular automaton model [2]. There were many vehement attempts to figure out the mathematical Rule that governs the cellular automaton model of the Universe. The success comes from the side other than abstract mathematics: an engineering implementation of a model must plainly start with distributed mutual synchronization, apparently having property of fault-tolerance. Such an approach brings immediate results: cellular automaton excitons produce a spectrum of synchro-formations that exactly corresponds to all the stable elementary particles of matter and their interactions. The next level of the model substantiates the mechanism of the holographic Universe, which was anticipated in D. Bohm’s and K. Pribram’s propositions. The weird quantum mechanics behavior of elementary particles standing as a mystery for about a century is simply realized with interactive holography. Prominently, this yields a unique explanation to the otherwise incomprehensible effect of quantum nonlocality. A. Einstein did not consider the conceivability of such an effect, in his words, it would ”signify the end of physics as a science”. At this point in time, we are confronted with a bunch of imminent environmental threats that cry for urgent uncertain innovations. In this respect, the suggested worldview paradigm offers a rich collection of potentialities.

We would like to single out two prominent physical properties in relation to the considered construction: the tridimensionality of space and the anisotropy of the Cosmic Microwave Background. As long as physical and biological processes rely on the informational control of the holographic mechanism it is necessary that the waves involved in this mechanism propagate in accordance with the Huygens principle, i.e. with sharply localized fronts. Otherwise, the interference of holographic waves will blur. Huygens principle occurs strictly only in 3D space; this implicates the tridimensionality for the physical space and, hence, for the space of perception [23].

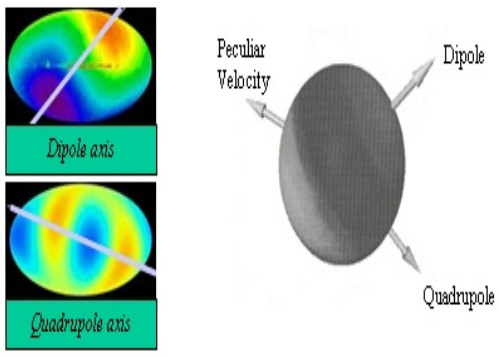

Fig. 2. Anisotropy of Cosmic Microwave Background

The appearance of the anisotropy of the Cosmic Microwave Background is of remarkable significance. To a very great

surprise of cosmologists, in about the year of 2003 a certain pattern built-in in the Cosmic Microwave Background has been discovered [24]. This pattern was called the Axis-of-Evil as it merely should not be there as commonly understood the Cosmic Microwave Background must be uniform. There had been put forward a number of esoteric ideas that the unexpected imprint in the Cosmic Microwave Background is a message from a Supreme Being or from a neighboring Universe. In our theory, the Cosmic Microwave Background is not a post-creation remnant of the cooling down matter, but an accompanying factor of the layered holographic activities. Our explanation of the anisotropy of the Cosmic Microwave Background Cosmic is natural, easy, and neat. The Cosmic Microwave Background is indeed uniform if observed from the center the pole issuing reference beam. But when observed from the eccentric position of the Solar system these activities become distorted. Our model exactly predicts the angle between the dipole and quadrupole axes: 40° (see Fig. 2). If necessary, higher order axes can be also exactly calculated and compared. Another, more simple and clear manifestation of the Holographic Universe is referred to in the conclusion.

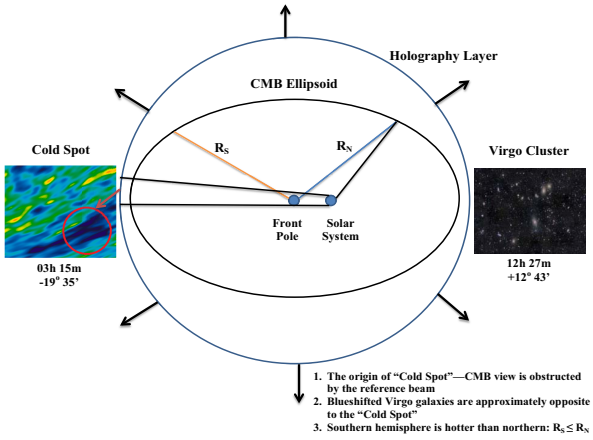

Fig. 3. Cosmic Microwave Background evinces the Holographic Universe

The detailed investigation of the CMB radiation undertaken by Plank mission has confirmed the previously observed anomalies and revealed certain anomalies that challenge the very foundations of modern cosmology. Most striking of those anomalies that suggest rethinking of these foundations are: a significant discrepancy of the CMB temperatures observed in the two opposite hemispheres of the sky and an abnormally large "Cold Spot". Our model portrays the CMB not as a radiation remnant of the material Big Bang, but as an accompaniment of a physical effect producing the holographic information processing for the Universe having the capabilities of the Internet of Things. Notably, If the CMB would come from cosmological distances it could not be correlated with the characteristics of the ecliptic. Explanation of the discovered CMB anomalies is a result of eccentric positioning of the Solar system with respect to the holography reference waves emanating from the pole of the Universe as presented in Fig. 3. The "Cold Spot" appears immediately because the source of the reference waves obstructs the whole view of the incoming radiation. At the opposite side, the Solar systems moves away from the Pole towards the blueshifted galaxies in the Virgo cluster (see [3]). The opposition of the "Cold Spot" and the Virgo Cluster is approximate. This is because the Pole and the Solar system are relatively close, so their connection line almost coincides with the tangent, while signals form the faraway Virgo Cluster travel along a chord that substantially deviates from the tangent. The presented scheme also elucidates the other essential puzzle: the CMB temperatures in the Southern hemisphere are higher than those in the Northern hemisphere. This effect is due to the fact that the CMB signals at a given moment of time arrive from different holographic layers having different intensities. Thus, the Southern hemisphere—the place of the "Cold Spot"—create CMB signals from closer holographic layers than in the Northern hemisphere.

IV. Realization of Natural Intelligence with IoT

In 1943 McCulloch and Pitts introduced a formal computational unit an artificial neuron. An elaborate network of these units is able to solve intricate multidimensional mathematical problems [25]. At the same time, there is a strong belief that complex artificial neural network activities should exhibit the sophistication of the brain. Yet the approach to the conception of the brain as a "complex" network of neurons is inadequate, since slow erratic combinations of electrical and chemical processes in neuron systems cannot match the high performance characteristics of the brain in terms of processing power and reliability. It becomes apparent that understanding of the brain needs a radical paradigm shift towards extracorporeal organization of human memory [26]; also, see the analysis in [27]. Extracorporeal realization of biological memory is based on our cellular automaton model of the physical world resulting in the organization of Nature as an Internet of Things. Since the organization of the brain operates with tremendous amounts of information its workings should be presented within a construction that is able to handle the suggested computational model for Big Data.

The information capacity of human memory should be virtually unlimited as everything is continuously recorded and never erased. From this perspective John von Neumann estimated that the capacity of human memory is about $2.8 \cdot 10^{20}$ bits [28]. The tremendous amount of information stored in human memory is used implicitly as a passive context, while only a rather small portion of this information is active explicitly. In the book [29], it is somehow estimated that humans of 80 years age actively employ only a very tiny piece of all memory information - about 1 gigabit. Influences of the passive background on the workings of the brain are in accordance with Freud's theory of unconsciousness.

The computational model with context-addressable access could be beneficial for a broad number of applications when the information processing performance increases with the accumulation of examples. Particular instances include learning a language, pattern recognition, reinforcing the skills etc. Building up a large context allows approaching the effective solutions of almost all problems. However, some of the information processing tasks, for example, arithmetic calculations, would be done more smoothly with ordinary computational models rather than employing Big Data contexts. The main operational mechanism for the implementation of the Big Data computational model is streaming. The significance of the

streaming capacity for the organization of the brain is exposed through the effect of the so-called Penfield movies [30]. This effect was observed by stimulation of different parts of the brain during surgery. The subject of this stimulation began to relive earlier periods of time in the greatest detail including various sensory components—visual, auditory, olfactory, and even somatic. Two circumstances are relevant to our Big Data consideration: first, the recall produces random samples of true experience, usually, of no significance in the life of the patient—context background, and second, the appearing pictures are ”time-ordered”, the events go forward but never backwards—this enables the organization of streaming.

The principles of holography materialize the extracorporeal placement of human memory. Holographic organization of the Brain and the Universe is a popular topic for abstract theoretical speculations [31]. In our concept, the holographic mechanism is a secondary construction atop of the cellular automaton model of the physical world (Fig. 2). Realization of a holographic mechanism entails clear technical requirements: a reference beam generating wave trains pulses and a relatively thin recording medium in compliance with spatial and temporal coherence. This leads to a special design of holographic memory with spreading recording layer. The presented construction naturally incorporates the otherwise inconceivable property of the Universe nonlocality.

The spreading activation layer of the holographic memory acquires and retains signals from all the events in the Universe. Among those are signals from the brains that are recorded as the states of its memory. This information is modulated by the conformational oscillations of the particular DNAs, so the whole holographic memory of the Universe is shared among the tremendous variety of biological organisms [32]. Full realization of the surmised computational scheme for the organization of the brain with the required holographic memory parameters does not seem realistic with the hardware resources available on Earth. As long as the major operation needed for the organization of the brain is massive stream processing, partial realization of this functionality for the suggested Big Data computational model can go in two directions.

First, following the way suggested in [33] the required stream processing could be arranged with the pipelining that has a distinctive capability to effectively accommodate on-the-fly computations for an arbitrary algorithm. The most essential part of this processing is the suggested technique for on-the-fly clusterization. This type of the brain functionality would be most suitable for special intelligent tasks, such as knowledge discovery formulation and verification of hypotheses.

Second, in a much broader sense, the imitation of Natural Intelligence could be achieved by direct implementation of the basic holographic scheme for the brain by emulation of the smart unobtainable hardware of the Universe with digital holography. This can be approached with Cloud Computing. At a given Internet site ”layers” of the holographic transformations for different objects are calculated with different angles of the incident reference beam. Search for a specified object is done by a sequential lookup for best matches with the digital holograms in the recorded layers. The incidence angle of the reference beam reconstructed even from partial match identifies the object. The computational process consists of iterations of these sequential lookups.

The mental activities of the brain are supposed to be completely software-programmable with such a Cloud Computing arrangement. The characteristic feature of ”subconscious” processing - manipulation with small quantities of data whose selection is holistically determined by the entire data contents - can be exactly accommodated in the given framework. The selection procedure can be paralleled with an iterative version of Google’s PageRank, where a uniquely specified item rather than a subset of items must be extracted. This specification may simply rely on a kind of ”I am feeling lucky” button, and might be enhanced using the established procedure for on-the-fly clustering.

V. Changing the Paradigm in Understanding the Physical World

There are many unsolved problems in physics [34], and their solution require changing the worldview paradigm (see, in particular [3]). Also, there appear several unconventional physical effects at the mesoscopic level, and especially phenomena in association with the living matter. A number of physical and biological events exhibit periodical annual variations. This has been attributed to the changes of the Earth position at the solar orbit as it affects its placement with respect to the universal holographic mechanism [11]. Most dramatically, this refers to the observed annual variations of heart attacks that realtes to the calendar rather to the season. Also, the same effect leads to calendar variations in some quantum experiences like radioactive decay, as has been indicated in Section II-A.

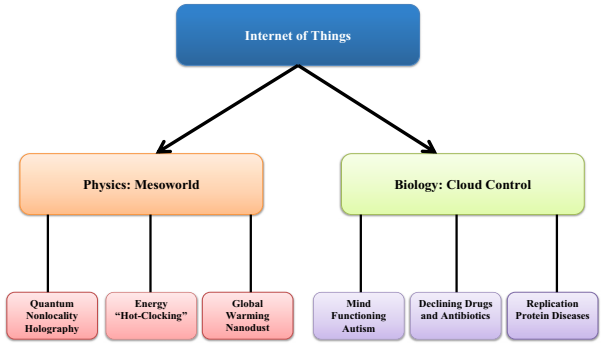

Fig. 4. Combining Material and Informational Processes

Coping with overabundance of information transpires in momentous laws of Nature. It requires enormous amounts of processing power, elevating the needs of exascale computing. There appear two types of problems: effective processing and massive formation. The first problem is resolved using bounded rationality, as it is not feasible to explicitly use all the available data. This leads to a new computational model with context-determined access producing a novel approach to Artificial Intelligence and portraying the brain as an ”Oracle machine” with subconsciousness. The second problem should deal with parallel operations, as it is not feasible to create bulkiness step-by-step [33]. We have considered a procedure for self-reproduction of macromolecules employing mesoscopic

displacements of holography feedback. This is analogous to the creation of Gutenberg's Galaxy with the breakthrough invention of the printing press. The problem of the arrangement of large informational structures can be taken care of by using cloud computing to join established operational contexts. Distortions of such a construction may cause autism. Fig. 4 represents the complex process of combining material and informational processes.

Any computer device begins with a clock pulses generator. In our view, the requisite production of the holography reference wave trains create such omnipresent clock pulses for what can be treated as quantum computing in the Universe. The frequency of these driving clock pulses is 10^{11} Hz. Thus, we introduce into consideration a new source of energy in the Universe stemming from the "hot-clocking" effect [35]. First of all, it was observed that application to biological objects of the electromagnetic radiation at frequency around 10^{11} Hz may supposedly induce certain interactions with the clocking process, which are intrusive although not malicious. Next, the physical world contains a considerable amount of cases where the origin of the involved energy cannot be strictly identified. Characteristic examples include appearances of the excess heat, sonoluminescence, ball lightning, exploding wires, biochemistry activities, locomotion of living creatures and so on. The connection of these emerging energies with the conjectured "hot-clocking" machinery could be suspected.

Of paramount importance is the fact that the "hot-clocking" effect may be responsible for the phenomenon of turbulence. According to R. Feynman it is "the most important unsolved problem of classical physics". Consequently, as "hot-clocking" is applied to atmospheric nanodust this may enhance turbulence collisions resulting in global warming and extreme weather events. Rough estimates of the appearing additional power show that it is commeasurable with that of the whole solar radiation. In practical aspect, it is appropriate to note that nanodust is easier to control than CO_2.

VI. Conclusion

The effectiveness of the given computational model encourages evaluating this approach for the general paradigm of the organization of biological information processing. Such a consideration leads to the view of the physical world as an Internet of Things. This kind of theoretical edifice is inspired by the practical advancements in modern information technology. Similarly, creation of the steam engine in the Industrial Revolution promoted the theory of thermodynamics. The new paradigm of the physical world as an Internet of Things materializes in the framework of the Holographic Universe. Distinctively, information processes in this construction realize the most mysterious property of the physical world - quantum nonlocality. Nowadays, conventional interpretation of quantum theory encounters more and more serious complications. Thus, several prominent scientists say that "the absurdity of the situation" cannot be ignored any longer and quantum mechanics" is going to be replaced with "something else". As such, we consider the "calendar effect" as introduced in [11]. The position of the Earth changes due to its motion on the solar orbit; so we can expect annual variations in all phenomena that are related to quantum mechanics. This "calendar effect" is of universal applicability, and it is apparently clear, like, for example, the statement that nearly all bodies expand when heated. Currently, most vivid examples of the surmised calendar effect have been determined for two phenomena: annual variability of the rates of radioactive decay in physics [36] and "seasonal" variations in cardiac death rates in biology [37]. Less clear-cut examples of calendar effect for numerous bio-medical occasions have been described; as to physics, these calendar variations have to be anticipated for a number of fine quantum effects whose outcomes should systematically fluctuate from month to month. Usually, people think that the discovery of new scientific concepts precedes technological developments. In fact often the situation is quite opposite: technological breakthroughs give food for thought for the scientific imagination. An emblematic example presents the development of the theory of thermodynamics after the steam engine incited the Industrial Revolution. Nowadays, the Informational Revolution moves towards its culmination point that would definitely be the ubiquitous penetration of the Internet of Things. The universal efficiency of such a construction makes the Internet of Things worthy to elaborate as operational concept for the mechanism of Nature.

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