

Jan-manasa na manute jenahurmano matam|Tadeba brahma tang bidhdhi nedang yadidamupasate||

No one can accurately underpin the universal consciousness even in deep inside his inner mind, wise men say, it is the deepest inner mind that is an expression of universal consciousness. Even the god that is worshipped by people with names and forms, that god is not the pure form of universal consciousness.

Jat pranena na praniti jeno prana praniyate| Tadeba brahma tang bidhdhi nedang yadidamupasate||

That cannot be expressed with the primary signs of life (breathing of soul ~ prana), but that universal consciousness composes the fundamentals of life form. Even the god that is worshipped by people with names and forms, that god is not the pure form of universal consciousness.

10 Uploading Consciousness— The Evolution of Conscious Machines of the Future

10.1 A JOURNEY FROM CORTICAL PEN TO A CONSCIOUS EGG AS A COMPANION OF LIFE

What is consciousness? Would an organic nano brain or brain jelly ever be conscious?

The definition of consciousness: “Consciousness is an ability that enables a machine to define and evaluate all its behavior by taking all its information content outside as three distinct identities; a conscious machine has at least three distinct information architectures, which could interact with each other and edit, independently.” Truly, this is Russel’s paradox, but this paradoxical definition would satisfy much of the conscious entity’s behavior. All other criteria, except having three distinct information architectures simultaneously operating could be realized by a classical simple Turing system.

The definition of information contained in the brain or for consciousness, “Information content is an endless architecture of time crystal following a pattern of primes that is localized in a matter, following which the matter perceives it as a finite state.” **The evolution of consciousness:** Transformation of phase prime metric (PPM) encoded in a matter’s finite state residing inside an endless time crystal of nature, it is synchronization of symmetries between a living entity and nature.

Consciousness is defined as self-awareness, the ability of a species to create a system point outside its body wherfrom it can evaluate every single reaction, operation, the thoughts, and the dreams of its own physical body. Hardware can have two co-existing states simultaneously, e.g., a qubit, or three

coexisting states like a qutrit of quantum. However, quantum is rigid, it does not allow multiple imaginary worlds coexist and operate by interacting with themselves. Quantum mechanics does not allow to make a hole in the phase space, fractal mechanics make holes, blink it, i.e., open or close by wirelessly pumping a signal. While deriving quantum formulations from the information content it was argued that angle between the phase space controls the probability of choices (Wootters, 1980, 1981). It was a very significant discovery. Afterward, it was further shown that the combined probability of three choices is the square root of the products of three probabilities (Fisher, 1922, 1956). However, this is true for only one kind of geometric relations. We have introduced a metric of primes (PPM), that finds hidden patterns in all events represented as geometric shapes. Therein, the probability of a combined choice is an infinite series of symmetry of the geometric shapes, not one (see [Chapter 4](#), fractal mechanics [FM]). Thus, Wheeler’s dream to deduce the existence of the universe could be pure geometric, as he wanted, but, not using pure quantum mechanics that we know. When we add one condition, that one of the three mirror states changes partially by the typical geometric relationship between different parts of Hilbert spaces, it is more like a classical system, not quantum. Moreover, when there is no classical point, then, all points are either located in the imaginary world tensor of phases or singularity points, undefined, because they hold unique information inside, then, neither classical nor quantum tag fits it. Thenceforth, the mechanics are named as fractal mechanics ([Chapter 4](#);

Reddy et al., 2018). Now, if we imagine that hardware can create three replicas of its information structure representing the brain hardware, and all three structures, edit each other's symmetry breaking features at all time scales, then, we get the most primitive machine inspired by phase prime metric or PPM. Then, an infinite chain of clocks one inside another forms an undefined singularity network, the chain is not linear or non-linear; it is a nested sphere, i.e., a universal time crystal (Chapter 2). Such hardware we define as a conscious machine, since, it syncs with the universe, an infinite pattern of primes and a coverage of 99.99% of all symmetries make sure that we understand everything that happens around us without writing a single line of code.

One schematic of an artificial conscious brain design is shown in Figure 10.1a. We cannot cover all aspects of consciousness, but, we keep a provision, that is, if a random

number of events are given to us, how they were linked in the past, to be linked in the future could be determined from the metric. It is a primitive yet first step to reverse engineer consciousness. Figure 10.1a is a commercial prototype of the human brain-body system, upper hemisphere is like human brain, but the entire human body is shrunk into lower hemisphere. Imagine in the future, people would buy a ball as a conscious companion, whatever a human does a whole day, is updated in the jelly.

How PPM computation research unravels a new way to look at the same universe?

There are primarily three steps executed by a conscious machine, using its PPM filters time crystal from the environment, then filters it for the processing elements of the brain and finally, time crystals missing in the brain is absorbed (Figure 10.1b).

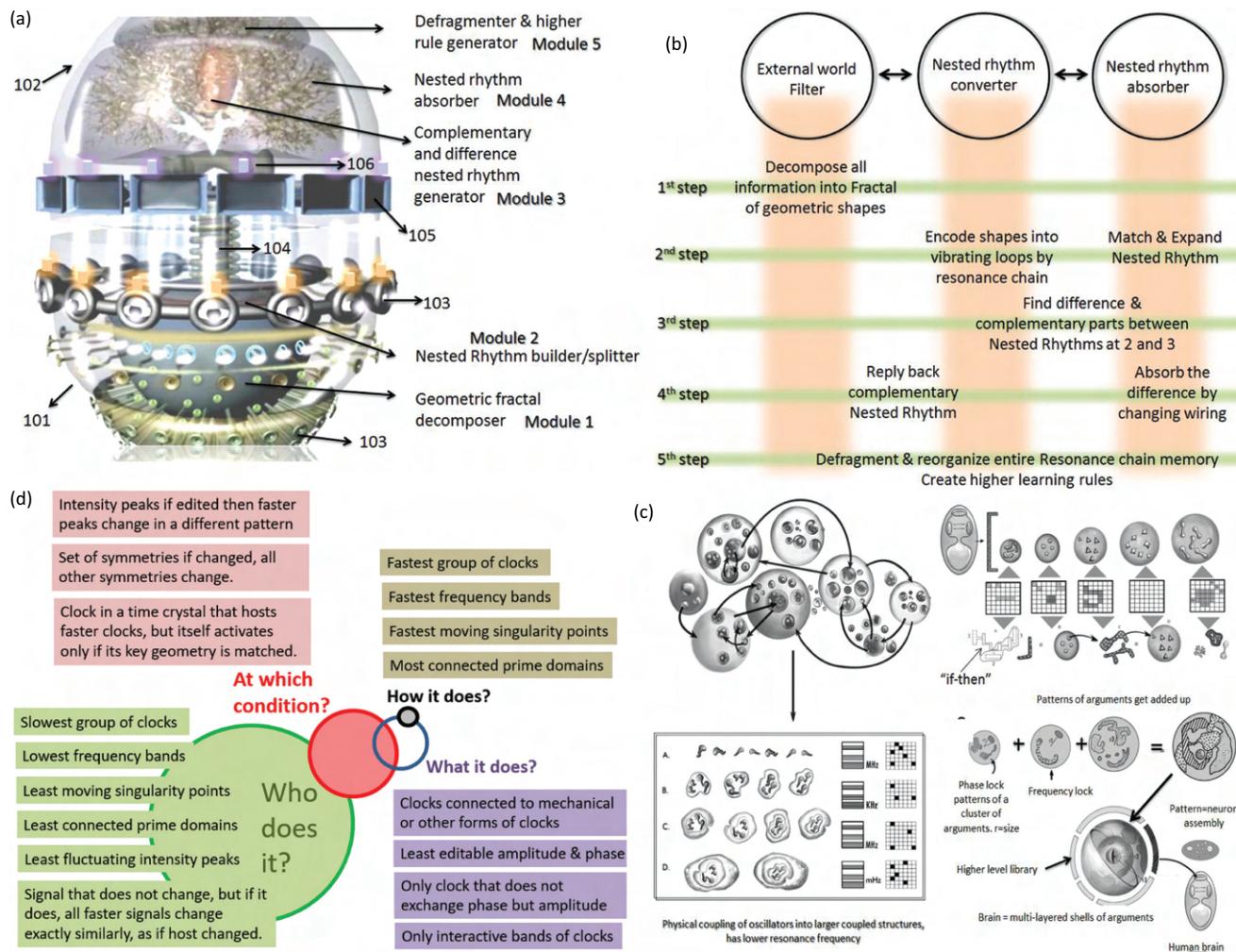


FIGURE 10.1 (a) The design of a commercial version artificial brain as an egg of consciousness companion. (b) Five different hardware modules are explained in the panel (c) The operational mechanism of nesting of time crystals shows interaction of time crystals at various hierarchical layers of hardware in the time domain. The physical structure of the hardware does not represent the true picture of the brain. (d) The information structure that the artificial brain captures is a linguistic architecture. The sensors are not dumb devices that awaits the signals to shine on it, rather, it seeks fundamental properties to fill four imaginary layers as quaternion. Each layer holds physical significance. In the chart linguistic-based transformation of information structure is defined.

1. **The whole body is the human brain:** Biggest mystery of understanding the brain lies when pulses are created at the sensors, in the skins, tongue, eyes, nose, and ears not in the neural network of the central brain. Information of external world is converted into a mysterious stream of pulses right at the sensors, we decode that as time crystal to learn brain, the biggest mystery of the brain is to be solved not at the brain but at the sensors.
2. **Evolution is a process of enriching the resonance chain to mirror image of more parts of nature:** The objective of life is to enrich the resonance chain, those who fail, disappear from the planet, as part of evolution. Darwin's view of the conflict of the matter is a primitive explanation of evolution, the true evolution could be a dance of matter and wave in harmony as we reported the same for the proteins in [Chapter 6](#).
3. **Mirroring the nature in the resonance chain is consciousness,** the density of allowed vibrational frequency in a band and length of the frequency chain (10^{-10} Hz to 10^{16} Hz) determines the degree of consciousness. Therefore one can quantify how a machine could evolve and reach toward consciousness, there is a threshold value to start mirroring the universe or nature around, however, there is no upper limit.
4. **Fill in the gap in the resonance chain is the true understanding of a functional brain:** The real human brain-building project would be taking each material in the brain and fill in the gap of the resonance chain that we created by experimentally measuring the resonance chain of the brain (10^{-10} Hz to 10^{16} Hz). PPM-GML-H triad project is fundamental research in the understanding of the functional working principle of the human brain, it demands an entirely new culture of constructing the brain in future.
5. **Brain or every living thing performs only one computation in life:** It begins at the birth of a baby in the mother's womb and it ends with the death of human life. Life is a single pulse of the lowest resonance frequency of a life form, the chain vibrates as one string (10^{-10} Hz to 10^{16} Hz). It is the same with the universe too. One rhythm, one oscillator, one tape with one cell... inside it's a nested network of those elements. The nesting of everything in the form of escape time fractal is the key, this is a major paradigm shift from the existing iterative function system type fractals which until now was mostly used in designing the hardware.
6. **Living and non-living things are subtle differences in nested symmetry clusters:** Nature concentrates more resonance states in the chain in some matters which we call life or brain and nature dilutes the resonance states in some matters i.e., open space, just like we have black holes and supernovae in the galactic universe. PPM-GML-H protocol sees the universe as

nested resonating material, does not engage in differentiating the living and non-living objects, one unifying principle of the density of resonance chain and its length determines living and non-living entity.

7. **Multiple imaginary worlds: Beyond quantum:** Background microwave radiation in the 3D sky around our planet resembles the map of the potential distribution of a single molecule, so many papers claim to read that pattern. If we look at fMRI images and no one tells us what it is, potential fluctuation looks just like a single molecule, where multiple atoms are sharing a single electron in an amazing way. The simultaneous potential changes are strikingly similar when we are in the quantum world or in the classical world. Since PPM mathematical formulations use nested clocks, there are multiple imaginary worlds unlike quantum where there is only one imaginary world.
8. **The supremacy of spiral symmetry:** Microtubule is another DNA, instead of genetic codes it holds the thermodynamic code. Not written like DNA does not mean no code exists. Microtubule holds the map of 3.5 billion years of evolution, but people do not have time to look beyond DNA. The spiral symmetry is everywhere from DNA, the secondary structure of proteins to solar systems even to the blackholes.
9. **Evolution of rhythm with materials: Unique programmable matter:** Brain plays a music like Indian classical raga; it means a set of rhythm unfolds infinitely just like a coded self-assembly, everything we see, hear, taste, touch, smell is decomposed in terms of a few geometric shapes and the entire song unfolds when we interact. Since time crystal runs, all our expressions are some or other forms of music, so are the events of this universe. Thus, a single rhythm can accumulate matter to grow manifold perpetually until an equilibrium is reached with the external universe.
10. **Resonance chain resides at every single point:** The entire universe has been interpreted a single mass, a single wave function and a single photon, that photon never gets old, it is everywhere at every moment, we can go inside it, find seeds, then take one go inside find another seed, the journey would continue to the Plank scale. A chain of mass, a chain of resonant vibration starts from Plank dimension to the ultimate universe, our brain is a small chain and a part of this universal chain. Every point is therefore a mirror of the entire universe. Due to this escape time feature, not a single point of this Universe could be touched.

10.1.1 How We Construct a Sentence Is How We Think

The neural network started in 1943 by Mcleod and Pitts, then, the neuron was considered as a logical device. In the 1960s, F. Rosenblatt and B. Widrow introduced adaptive neurons. Finally, the concept of a 3D surface of hills and valleys where

computation moves through minimum energy paths was the most remarkable adoption in the 1990s by Tank and Hopfield (1987). The computation begins with a random initial state as a pattern, and then, via adopting the evolutionary pathways, system reaches the solution pattern. Contours of the surface continuously change due to environment and system tries to match as brilliantly explained by Hopfield and Tank while discussing collective computation in neuronlike circuits. Computation beyond Turing limit has enjoyed several failed proposals, including the idea that in a highly chaotic dynamic system one can use shift map connecting many at a time to stretch beyond Turing (Siegelmann, 1995). Finally, we come to an infinite structure of bubbles here in this book, playing with primes, where the whole universe turns out to be an undefined structures of singularity points. The journey to traverse is from everything is defined to nothing is defined.

In the last century, the language has evolved and now we have geometric musical language (GML). In [Chapter 2](#), we noted that a quaternion is the brains decision structure, *who, when, what and how*, are four questions. However, in the course of this book, we have outlined how one could see these questions from various research fields. In [Figure 10.1c](#) we have summarized all variants of four queries. If a person just looks at a big data, notice the changing in a 3D complex pattern, what would it look for, this is an important question. One could try to find periodically repeating events while building an architecture of confusion. Start using a concept where you are confused, go inside and find one of 15 geometric shapes where corners are confusion. Repeat until you reach facts. However, which clock to put where in which confusion? The outline is below.

10.2 TEN KEY GUIDELINES TO REVERSE ENGINEER A HUMAN BRAIN

Unconventional life-like computations by honeybee and algae: Recently, news came up that honeybees are solving the problem of a traveling salesman. Of course, even a mosquito can solve this problem. Computer fails to solve this problem within a finite time because it wants to find the exact solution considering all possibilities. In PPM computing philosophy search and find is performed without searching because the element with the right answer responds spontaneously. We living creatures' can spontaneously respond, so is the programmable matter proposed by Toffoli and Margolus (1991), its prime example is brain jelly. We can take up a few choices and follow one of them, which may be close to the exact solution, even if not, we don't care. We can stop computation at any point in time, can make a decision even with less than the minimum amount of resources required to solve a problem. It is a remarkable computing ability. Can one imagine a situation, when a computer is asked to add five numbers, while two given; don't wonder if computer pulls off its own power plug and put the plug in the operator's hand as an answer! Faith on live materials is paramount. One example of such an idea is the creation of the Tokyo metro map using physarum. They feed the algae sugar and salt at particular station locations, physarum grows connecting the stations. Again, we can

test the same by asking a group of ants to follow the bumps of sugar kept on a checkerboard; possibly they would also solve the traveling salesman problem successfully. Even using plasma, mesh problem has been solved as the material tries to find minimum path via trial and error, then it is a programmable matter. These kinds of approaches to solving a problem have been categorized in the unconventional computing paradigm. If we do a similar simulation in the existing computers, we complete the logically circular path, i.e., compromise with "simultaneity." Analog computers are very funny: first, we have to tell the computer how to find the solution of a problem, by defining various functions and then we have to ask the question as if we have not done anything beforehand. Current flows through random paths for an external observer, however, we know that typical "randomness" represents either a logarithmic or sinusoidal function. Obviously, we get the answer. What an analog way to get the answer to a problem, instead of logic gate use direct mathematical functions directly! One can innocently argue, if one has to define "functions" and re-formulate a problem before starting the calculation, why not find the solution itself using the classical Neumann computer.

Four original concrete routes to build a neural network: [Figure 10.1d](#) outlines a unique feature of the artificial brain described here. There are plenty of distinct and multi-layered core-shell architectures. However, when we look into the time domain the geometry of the time, the architecture is widely different. It is a firm belief of the scientific community that information is stored in the synaptic junctions, and learning means strengthening the connection, since a permanent high potential is generated, scientifically it is called potentiating a junction for a long term potentiation (LTP). The scientific literature is divided into two parts: One-part deals with junctions that exponentially decays the stored information after one session of learning; the others avoid the complexity associated with this particular issue where the decay rate of forgetting plays with the rate at which we expose learning images to our neural network and exhibits interesting features of learning. When patterns are presented slowly to a neural network, N neuron can learn at most $\ln N$ patterns, since in this case the network has to learn one pattern at one shot, there is a possibility that it learns wrong information.

Reservoir computing: Reservoir computing is a framework for computation like a neural network. Typically, an input signal is fed into a fixed (random) dynamical system called reservoir and the dynamics of the reservoir map the input to a higher dimension. Then a simple readout mechanism is trained to read the state of the reservoir and map it to the desired output. The main benefit is that the training is performed only at the readout stage and the reservoir is fixed. Liquid-state machines and echo state networks are two major types of reservoir computing.

A liquid state machine (LSM) is a computational construct like a neural network. An LSM consists of a large collection of units (called nodes, or neurons). Each node receives time-varying input from external sources (the inputs) as well as from other nodes. Nodes are randomly connected to each other. The recurrent nature of the connections turns the time-varying

input into a spatio-temporal pattern of activations in the network nodes. The spatio-temporal patterns of activation are read out by linear discriminant units (Maass et al., 2002).

The soup of recurrently connected nodes will end up computing a large variety of nonlinear functions on the input. Given a large enough variety of such nonlinear functions, it is theoretically possible to obtain linear combinations (using the readout units) to perform whatever mathematical operation is needed to perform a certain task, such as speech recognition or computer vision.

The word liquid in the name comes from the analogy drawn to dropping a stone into a still body of water or other liquid. The falling stone will generate ripples in the liquid. The input (motion of the falling stone) has been converted into a spatio-temporal pattern of the liquid displacement (ripples).

LSMs have been put forward as a way to explain the operation of brains. LSMs are argued to be an improvement over the theory of artificial neural networks because: Circuits are not hard coded to perform a specific task, Continuous-time inputs are handled “naturally.” Computations on various time scales can be done using the same network. One network can perform multiple computations. Criticisms of LSMs as used in computational neuroscience are that LSMs don’t actually explain how

the brain functions. At best they can replicate some parts of brain functionality. There is no guaranteed way to dissect a working network and figure out how or what computations are being performed. It has very little control over the process. The model is inefficient to implement because variables require lots of computations, compared to custom designed circuits, or even neural networks. If a reservoir has fading memory and input separability, with the help of a powerful readout, it could be established that the liquid state machine is a universal function approximator using the Stone-Weierstrass theorem.

The echo state network (ESN) is a recurrent neural network with a sparsely connected hidden layer (with typically 1% connectivity). The connectivity and weights of hidden neurons are randomly assigned and are fixed. Learning the weights of output neurons enables producing specific temporal patterns. Although its behavior is non-linear, the only variables are the weights of the output layer. The error function is thus quadratic with respect to the parameter vector and can be differentiated easily to a linear system.

Now, we return to the time crystals produced by brain-jelly-derived artificial brain in Figure 10.2. When we look at the peacock dancing, listening to an Indian classical song, proprioception or feeling that we exist in this environment with a

Information in the brain: some examples

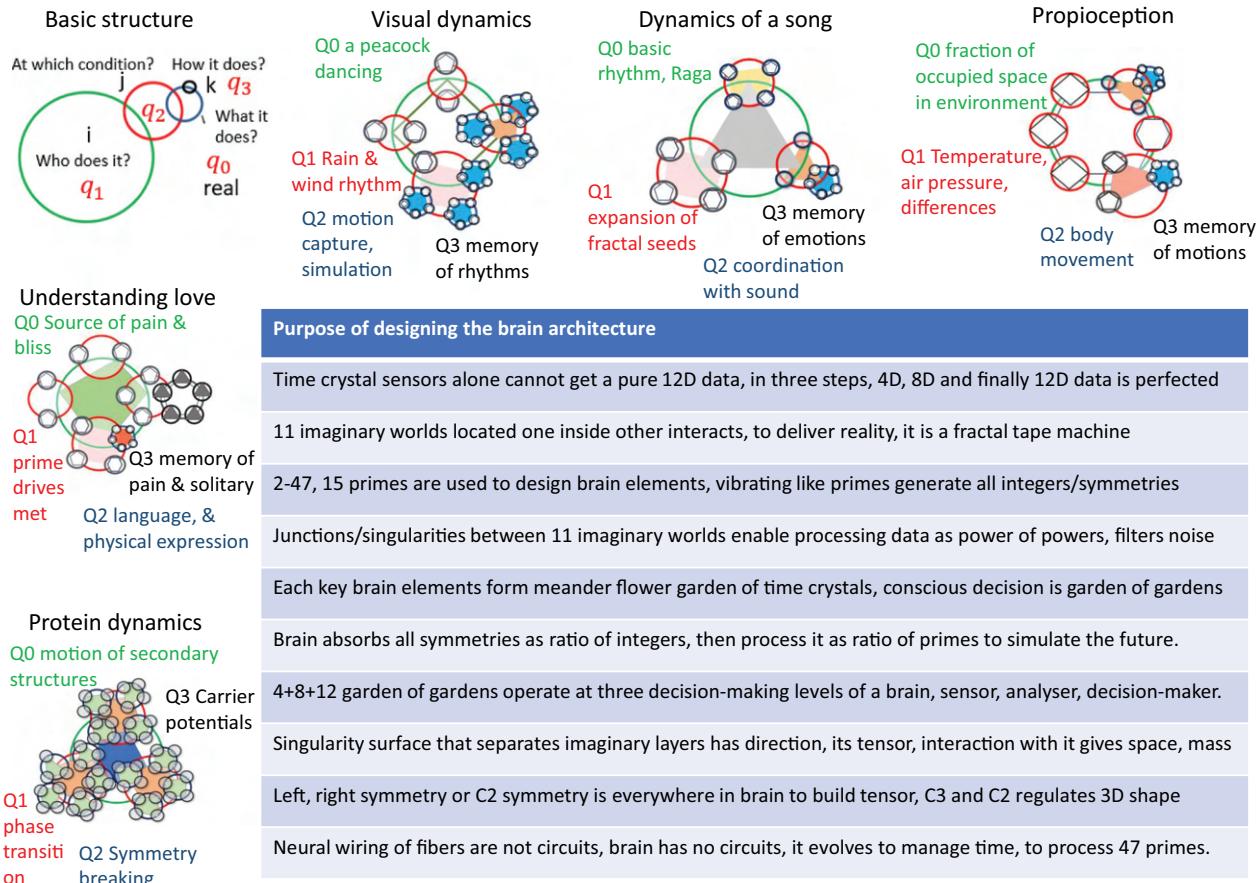


FIGURE 10.2 The applications of linguistics based information structure are outlined in the five examples of processed information in the software brain. In the table ten key guidelines for designing the artificial brain structures are noted.

physical body, how deep sense of missing someone creates a sense of love, when a person falls in love; and proteins under massive ionic motion to carry out fundamental tasks for the life form. All these situations are very confusing, and an artificial brain is designed to get into confusion and build a map. The dancing of peacock is confusing because in the rain when one sees a peacock dancing suddenly, why we don't know but we feel like we are in heaven. Classical Indian songs run for a whole night, 12 hours sometimes, we cannot say anything but only at the late moments the basic pattern and its architecture unfolds in our brain. Similarly, proprioception, we feel that we exist, but why and how we do not know. The story of confusion would go on and on, and that's how a kid should learn to solve mysterious problems taking a paper and pencil, build an architecture of confusion. [Figure 10.1](#) prepares the readers mind on how sensing the architecture of confusion should begin a new paradigm of decision-making beyond logic and arguments. At this moment it is worth for a moment briefly look into the summary of this book, how we described the purpose of building the artificial brain (table [Figure 10.2](#)).

10.3 TWELVE PARADOXES THAT WOULD CHANGE OUR THOUGHTS FOREVER

The journey from neurogenic brain model to time-crystal-based brain model transforms the fundamental philosophies we believed thus far ([Figure 10.3](#)). Instead of

equations, patterns would take over, replace equations and a science to harvest singularities using symmetry of primes would be born. Feynman argued to replace everything with the changing pattern and there were plenty of followers. Several greatest thinkers put thought into this matter, but none took this seriously. Latest in the frame was Wolfram, who wrote even an entire book on the new kind of science. Many researchers learned to investigate the origin of a new kind of science with these physicists. And then the time came when we realized that the dream of implementing pattern-based computing would never succeed if we remain within the domain of Turing. We have to go beyond, and we also realized, all proposals of hypercomputing are not that effective to implement Turing's forgotten ideas in computer science (Copeland and Proudfoot, 1999). **The Turing principle is so powerful that if anything is defined we are baptized by Turing religion, and the only way to go beyond is to enter into the world of singularity, an escape time fractal but self-similarity does not exist. However, the journey is not easy, in this book we covered wide ranges of topics to explore one possible way.** Quantum's one-imaginary world shakes the reality; then, 12 imaginary worlds with one pseudo-real have arrived to shake it even further. Quantum entanglement in room temperature raises heat more in the mind of fiction agents than scientists, it is possible to do quantum computing without quantum entanglement (Lanyon et al.,

Neurogenic brain model	Time crystal brain model	Quality	Design principle
Neuron membrane does all information processing, it is the smallest unit	12 gardens of time crystals form canopy, topology of time, no device is absolute, smallest unit--helices	Consciousness	The bandwidth of resonance chain beyond threshold peak density and length sync as three distinct identities outside the physical boundary of the chain but located on the universal resonance chain.
Map neuron network, replicate physical map, get a brain, artificial intelligence	Map symmetry of nested clocks at all spatial time scales, replicate, get a brain, natural intelligence	Intelligence	Brain jelly identifies missing symmetries & grow associated time crystals which were absent in the hardware of both sender and receiver.
Unit: switch, turing machine, circuit	Unit: time crystal, fractal machine, meander garden	Creativity	Time crystal associated with phase transition is created that adds a metric of primes in the system, new methods to create time crystals begin.
1D data flow, data structure: bit/qubit	10D data flow, data structure: three nested clocks	Adaptability	Phase prime metric made of dodecanions create a resonance chain that is made of twelve distinctly operating phase prime metric based independent systems would be able to emulate 99.99% information generated in the universe.
Water is silent	Water converts all biomaterials into superlenses	Plasticity	15 geometric shapes, 15 primes, 3 types of phase prime metrics, 10 classes of metrics of primes cover 99.99% of all possibilities. Hence hierarchical network of symmetries ensure a new unprecedented symmetry to replace a composition of symmetries that was governing a local part of a hardware.
Noise disrupts operation, current-voltage property is key device operation	Harvests noise, magnetic flux-charge induced clocking is the key device operation	Universality	Simply, universality in computing means emulating everything, that ability comes from the engineering principle of using 12 systems at all scales, at least 12 primes, at least 12 geometries, at least 12 metrics build at least 12 distinct hardware.
Cortex region is the key, all operations happen in the brain, by neuron circuits, there are logical operations.	12 organs spread over the body is integral part of the brain, information processing happens in topological architecture of time of all 12 organs. No logic its loop	Learning	Learning is an identification protocols by which the PPM computer determines which time crystals or symmetries stored inside and which does not, the difference rhythms are created and written at the suitable places.
Only ionic clocks exist, clocks are not integral part of information processing.	12 classes of clocks run by 12 types of carriers, ion one of them, all are linked, part of information.	Thinking	Thinking is a process by which a hardware uses the pattern of primes to artificially create the time crystals for filling up the missing symmetries and expand.
No embedded language, no controller	Geometric musical language, GML; PPM controls all.	Emotion	The basic driving criterion that are set for a brain to learn and evolve with time. The driving time crystal generates its own higher level maps for the futuristic learning. This crystal is also a filter that transforms the geometric shape of a time crystal exchanged between sender and receiver.
Pattern of primes has no role	Pattern of primes link geometric shapes, it is thought	Growing	Dodecanion tensor and nesting of resonance chains are not limited to 12, 12 is the beginning of the journey, next level would be 12, 18, 36 and so on
Diffusion of ions=information dynamics	Neither classical, nor quantum, its fractal mechanics		
Energy is proportional to info transfer	Symmetry transfers, info is regenerated post transfer		
Spike is key, its frequency maps all info	firing mechanically adjusts neuron, time crystal is all.		

FIGURE 10.3 Differences between neurogenic brain models that are there for nearly 70 years and the time crystal-based brain model (left). To the right, a table that compiles the consciousness features in the artificial brain jelly.

2008). Using polarized laser, room temperature quantum experiments could be carried out and zillions of molecules are all quantum devices operate under massive noise. We advocated for optical vortices in [Chapter 8](#), rejecting the world of electronics totally, so, the fear of decoherence would reduce sooner or later.

PPM-GML-H triad has made one little statement, “Every single cell of a Turing tape contains a Turing tape inside.” If we do just that, we break Turing tape, but we fall into a singularity. We cannot do the science of Classical mechanics or Quantum mechanics. We needed new mechanics, to model the interaction of imaginary worlds ([Chapter 4](#), dodecanion algebra). Not only that we had to find the true scientific construct of information in Nature ([Chapter 2](#) time crystal). Developing a new scientific protocol for addressing the information integration such that natural events could be replaced should be our first and foremost target. But, even if we integrate information, what would we do? Shall we recreate the natural phenomenon. Shall we take the whole information or would adopt reductionism? Then came the question of representing a observable simple phenomenon in nature, we built the concepts of (i) fractal tape, (ii) three imaginary world’s construct of information, (iii) resonance chain, and (iv) frequency wheel then combined them to generate an information construct for the natural system, just like the one we created on a nano-surface with molecules ([Chapter 9](#), brain jelly).

The greatest problem that we have had is that “logic” and “argument” are to be replaced by time cycles and new mathematical and other constructs need to be built for the singularity architecture. We needed a new language to process information, we have built one, this is called geometric musical language (GML). Using this language, we can convert any sensory information like visual, auditory, smell, taste and touch signals into nested time cycles and re-write it in terms of primes so that PPM morphs the 3D clock architecture.

What would be haunting a general people is that if all the above jargons are true, how the philosophy of the new world of science be like? Unbelievable, remarkable like Quantum or something even funnier, shocking and amazing. Note that all we need to know is that imagine a Turing tape and each cell has a Turing tape within, or “**a new typewriter inside every single key of a typewriter**,” that is sufficient to come to the science of singularities, but we need to have an attitude, “**We will not try to bridge the singularity using brute force, like re-normalization we will float and go deeper inside singularity and above to learn what are there, using specially designed tools and mathematical constructs for the new kind of science.**”

While discussing the philosophy of this singularity harvesting science, we will see that we need to include everything that quantum information processing suggests and then we need to go beyond, far more exciting features like topology of undefined regions in a network, need to be included.

The science of architecture of singularity is absolutely not classical and far beyond quantum.

Why both classical and quantum mechanics fails and how should we work toward the development of a new kind of science?

1. *The trumpet-paint time-cycle paradox: Using the Gabriel’s Trumpet paradox:* For Quantum, we have “incompleteness,” so there was a series of development to “supplement,” here we need to have “penetration boundary” because every single point in this world view (PPM-GML-H) is a singular point: Just like quantum we need, another historical movement for perfecting the journey into the singularity: “Every single cell of a Turing tape contains a Turing tape inside.” One to one correspondence between Gabriel’s paradox and nested time cycle synchronization that is designed to replace renormalization, the surface area of the cone is infinity, however, when we put paint to color it, the paint passes through the tunnel and it blocks at the point depending on the density of the paint. The paint for us is the observer’s nested time cycle, it could penetrate above and below and much far away, it does not need to pass through as someone from far could “spontaneously reply.” The resolution of the solution is always ultimate, therefore, just like quantum we do not have any predictability, we also need contextuality, but in quantum the object that we are measuring has got something, but for us, that object has got nothing.
2. *The paradox of infinite network of reality spheres: Using the Banach-Tarski paradox and the “measurement” in fractal information theory:* In contextual measurement in quantum mechanics observer has a Hilbert space and the measuring state also has a Hilbert space, they interact to create a common Hilbert space with an inner product. However, for a non-computer, PPM creates a 3D projection of the observer, we have three Hilbert sub-spaces, one for the world below, one above and one for the observer. However, we do not need to create them in a large number. Suppose we have a nested time cycle sphere, like the time crystal shown here, the observer would also be a sphere, it would sync with the paths and generate the connected path and form a “reality sphere” just like the one here. Creation of an identical information replica is its greatness because the solution of a problem is an infinite space. The Hyper-Webster dictionary and the generation of multiple spheres: If there is a large number of observers, of course there is an infinitely large number of observers, therefore a large number of “reality spheres” will be produced and those would merge just like the Hyper-Websters dictionary. All these spheres are distinctly produced, yet they create a singular identity. Imagine thousands

- of “reality spheres” being produced and all of them simultaneously hold the solution.
3. *Resonance Drive Paradox: Density of resonance frequency R and frequency bandwidth B product RB determines the degree of consciousness elements, when the environment remains constant.* The ratio of RB of a device and its environment is an essential index or the degree of consciousness ($C = RB(M)/RB(U)$). There is always a spontaneous drive of any fractal cavity resonator structure to increase bandwidth ratio, this is perpetual, it is never-ending, the machine senses more and adds more bandwidth then evolves to sync as much as possible. Resonance drive paradox leads to several other drives, for example drive to morphing, etc.
4. *Number system derived metric and its saturation: Ordered factor paradox:* Reddy S. et al.’s number system study (2018) shows that only 12 primes are sufficient and the number of solutions of fractal cavity resonators reaches 99.999% new situations by 10^{12} oscillators alone, therefore, we do not need infinite or astrological number of oscillators. Then how could a large structure form? The code to generate new structure must make a fractal repeating its entire process after each limit is reached. When we get a structure of 10^{12} oscillators, we consider it one and start re-counting. It is the reason, the universe appears like a fractal, but actually it is not a fractal, GML follows the pattern of primes, and the primes never repeat.
5. *The observer-absolute paradox:* In a fractal tape there is no finite-state for a particular cell, the observer syncs with the world below and the world above and creates a state for the measuring cell. Then we never write information in this tape in any cell, we write only in the observer, only the observer exists and the rest everything, even the tape does not exist: Twelve fundamentals of new information theory: (i) Instead of modeling, fitting, we try to do morphing, The morphing of frequency wheels through the number system derived resonance chain is the route for information processing. (ii) The same information is complete at the moment, a fraction at the other, linking clocks at a particular time enables global link, this is a weakness of PPM-GML-H triad system. (iii) The same information content gets a different property at different environment, in the reality sphere, the same plane holding many nesting cycles behave differently. (iv) System spontaneously emerges information, even when no question is asked. (v) A mirror image is created without changing the source, though both the source and the reader are coupled. (vi) The same information takes different form at different times thus creating wide ranges of information, also it looks very different from different directions. (vii) Information is alive; it senses, expands creates new life forms. (viii) Information is a phase, frequency intensity of time cycles, these time cycles could self assemble in a single or multiple planes, they could make 11 planes holding 11 dimensions. (ix) Dimensions representing different planes inside the sphere rotates differently for different planes to accommodate higher dimensions. (x) Starting phase and direction of motion of system point are two parameters that higher-dimensional planes process. (xi) The pot and the matrix are the same: the information that shapes information content is the information itself. (xii) Identical information holds the same content yet different meaning, very different information holds the same appearance, duality is embedded.
6. *The paradox of infinity-mechanics:* Quantum mechanics is a subset of fractal mechanics: Ten differences between quantum mechanics (QM) and fractal mechanics (FM) (i) One imaginary world in QM, and three imaginary worlds in FM. (ii) Uncertainty principle is universal in QM, uncertainty principle varies, depending on the observer and 12 nested imaginary world configuration. (iii) Contextuality is a side part in QM; contextuality is everything in FM, the observer is the only reality, “supplement” to complete a quantum state is essential; in FM, continued fraction geometric algebra generates an infinite series to hold that. (iv) Entanglement is a property in QM; in FM, entanglement is the way time is connected. (v) Quantum deals with matter; FM only time-cycle. (vi) QM has its own version of condensation, interference, oscillator; FM also has its own versions for each of them. (vii) Psi is absolute in QM, Psi is deconstructed in FM. (viii) Like QM there is a Hilbert space, but they do not take the tensor product of the inner space. It’s a phase-orientation calculation of time cycles in FM. Instead of normal tensor algebra we need continued fractal-based geometric algebra to process. (ix) QED is based on a field-theoretic concept, for FM, a universal unified field exists made of 12 nested time cycles and 12 dimensions. (x) Quadrupolar moment plays a vital role in determining complex time cycles in FM, but that is irrelevant in QM.
7. *The paradox of quest: Ten cultural practices that existing scientific practices follow and we do not need to make them blind religious:* (i) Survival of the fittest, not just in biology, quantum to astrophysics to elementary particle physics, this is applied as a universal physical principle. Co-operation

- to survive is just opposite to the idea of struggle for existence. (ii) Something equals something: Equations or inequalities is the only form to get an answer, except one, all variables should be known. (iii) Step-by-step, not above and within: Searching systems believing that they would work step-by-step is generating craps. (iv) Universe is sum of two-body system: all other particles vanish from the universe, many body theorems are forceful relationship building exercise. (v) Do anything in the name of closed system: Scientific practices limited resources, always considers close system to anything and whenever necessary makes it permeable, stops, or vanishes anything. (vi) Decision-making requires selection and rejection. Build many options and then reject all but one. (vii) Order and degree of differential equation captures all possible variations of a natural system: We say that nested time cycle could capture with the three imaginary time worlds operating simultaneously (viii) Singularity has to be bridged: Dancing in the singularity is all what we need to do in our singularity kind of science. (ix) Only one time, only one cell of a tape, only one clock, only one of everything: In the existing science there are plenty of things, for PPM-GML-H triad, there is only one thing, a single time cycle that encompasses all. (x) Everything wants to be complete: Every single system in the universe has different objectives in the current science, but for non-computing, all systems have only one target to achieve 10–12 prime-dynamics, a goal for 10^{12} oscillator-assembly.
8. *The cycle-non-reductionist paradox:* If there are many choices, then without reduction we cannot make a selection, what if there are not many, and we would never have to choose, in the information processing protocol we follow “spontaneous reply,” only the right one answers to the query. Therefore, the question of reduction does not appear. The next question is that when we model a system in nature, do we mimic the system as is? Do we take all the information? No. Just like a single cell creates a full grown human, a few delicate codes of the natural system could regrow by morphing, the recreation could be limited by the number of resonators and its design. The information space gets filled up with matter, with a few codes it is build up. Ten principles of a Fractal tape: (i) Every single cell in the tape has tape inside, we get a fractal tape. (ii) A tape has four tuples, convert to nested time cycles, match and expand, transform and reply back, restructure internal wiring or learning. (iii) Triplet of time cycles is a unit of information, three imaginary worlds with a real world builds a quaternion. (iv) Two kinds of fractals—ET

and IFS—work together to make the fractal tape. (v) The tape and the imaginary world do not exist in reality the observer does exist in the imaginary world that it is fit to sense. (vi) Fractal tape leads to fractal machine just like Turing tape leads to Turing machine, an imaginary state processor, generalized complex number and the number system rule of 15 primes and 10^{12} oscillators is the key to create a cell in the fractal tape. (vii) The fractal tape is good for QM, FM, and CM all; it morphs to any information structure, fractal tape does not have a fixed geometry, PPM projects it to infinity ([Chapter 3](#)), feedback from infinity remains undefined in the fractal tape making the decision. (viii) It operates through GML using 15 geometric shapes regulated by 11D dynamics of 12 nested universes linked within and above. (ix) A tape finds the resonance frequency bandwidth of a system and draws a circle to connect it's various time scale, just like spiders net, but the fractal tape has many circles as clocks and it tries to touch all the clock boundaries first and then it goes for the faster and faster time scales. (x) The fractal tape can run sequential algorithm, but we use it to run projection from infinity for a pattern of choices. There is no search to find or transport communication among cells, the cells self-assemble to morph a system.

9. *The equation-inequality-fractal paradox:* In the conventional practice of science, variables are correlated and equated to represent a system. The science of equations has been very successful. Now, if there is no equation because of fractal tape, we needed to build up another language that runs in the undefined world. We replace equations with a new kind of algebra called continued fraction geometric algebra ([Chapter 4](#)). Using this algebra we solve several problems. It is the tool using which we plan to manage the world of singularity. In this algebra, we always have a circle and we draw several circles following a certain set of rules. To do all kinds of mathematics addition, subtraction, tensor operation and more importantly estimating projection from infinity. It is the route of doing mathematics by drawing circles and always making a journey toward infinity via singularity points only.
10. *The paradox of illogical, nonsense decision-making:* We are always advised to think logically. It means, we have to think that every event is a sum of several sequential events. However, it could be possible that problems and solutions entangle in a single time cycle, and then we integrate them to construct entire information processing architecture, then, there would always be the simultaneous robust response. There would be no logic like “if-then,” no argument then there would be what,

architecture of confusion? Here are the ten ways of arguing differently as practiced by the tribals for thousands of years: (i) A question always has its answer in it, no question could be created without an answer. (ii) A confusion is always the sum of a set of new confusions, thus, it is an endless fractal network. (iii) No answer is complete; there is always a question that invalidates the answer, fixing that to evolve answer is a journey to completeness. Gödel hinted, however, never suggested a route to explore the engineering of incompleteness. (iv) Logically circular or circular logic is the unit of a singular logic to enter inside and go above, always bring circular logic but follow the boundary limit of rule (ii). (v) Since question-answer couples are always together, every possible solution are connected to the question contextually. A question could have many answers in different contexts. All are mapped in a 3D nested time cycle geometry. (vi) Every single set of confusions form a geometric shape and a complex pattern of the composition of basic geometries should form to compose a complete confusion, the shape would be symmetric and follow the rules of geometries. (vii) No sensible confusion could stand alone, isolated; it needs support, even though a fractal arrangement argues that at the top there should be one unit of confusion, but even that would require at least three perspectives—one from the arguments below that makes it, one from above or the argument it constructs with others, and one the perspective of an observer. (viii) A true confusion does not have an idiom or universal truth, no assumption, all assumptions are environment and context-dependent. There is never a truth or a false statement in the architecture of confusion. (ix) Expansion of raga is the way to expand a confusion. We cannot add confusions one after another, place simultaneously, considering all as truth like quantum. We always find the geometry of confusions then expand them using PPM, just like Indian classical raga expands by extrapolating the input pattern of runes. (x) Every natural event has a geometric arrangement of confusion and the practice or game of confusion is to morph with nature's geometrical arrangement of confusion. (xi) A structure of confusion nested within and above always has one less variable than the fixed truth and a total number of variable and truth should compose like the number system metric, hence the network of argument could be constructed. If there is a little change in the most static confusion all nested confusions would change simultaneously. (xii) One could enter inside an

argument 12 times to generate 12 fundamentally different dimensions, however, if we enter more, then the relevance to the first argument becomes faint. We need to change the starting confusion point regularly to sustain relevance in the nested fractal-like confusion practice. The rule (x) morphing comparison is the route to auto-correct a confusion.

11. *The paradox of an infinite field and limits of the universe:* Infinity is everywhere in the fractal tape universe where the thing that exists is a singularity point and there are specific ten properties of this impossible universe: (i) If nature is discretized once, it cannot be recreated; we follow, everything is connected to everything: Probability theory is not required, PPM projection is enough to create enormous unpredictability. (ii) Every point in fractal tape universe holds an infinitely large universe within. (iii) Every single point tries to be dynamic following 12 prime, symmetries using the 10^{12} oscillator network to sense the environment with its maximum. (iv) There is no force, only the time-cycles and time gaps (domain of singularity); at the elementary scale, there exists only a time cycle. (v) Information is filled up in the all existing time cycles, total time cycle is infinite in number, they exist everywhere as infinite series. (vi) There are no zero points. To have a zero-point energy, also we cannot consider an external boundary if we simply consider universe is a frequency fractal, only thing it is made of is time cycle (of what? please note, vortex fields), there is no mass, no distance, all are perception of interaction between nested time cycles made of vortices. (vii) Nested time cycles self-assemble to generate all forces, and within 12 nested universes of dodecanions the time cycles self-assemble, all structures are formed. (viii) All fundamental constants are typical 3D geometric shapes which is a constraint made of nested time cycles. (ix) There is no total energy of the dodecaion universe in principle to feed the fields, because energy could be created and transformed, fractal network cannot have a boundary. What we see around us, and that is the truth, if we create a lower and an upper limit, we would surely need to tell what's outside. If we do not know what is outside then who gives us the right to draw a boundary. The energy could increase or decrease in a given imaginary world depends on the system, for that universe, we cannot make any rule, its PPM projection to infinity that decides everything. (x) There is no starting time and end time for the universe and for any event, in principle by the condition of fractal we are restricted to do that.

12. The paradox of time replacing everything: Universe is nothing but clocks of vortices of fields. We do not have mass, we do not have space, we have created everything, using only time cycles of vortices. The reason is that time cycles would interact and generate everything. It is how we have constructed the new information theory a new geometric language and this is what makes dynamics associated with primes distinct. Just imagine, only this consideration would shade significant light on the unsolved mysteries of matter-photon interaction. Even if we look at the Schrödinger equation, it shows clearly, we do not know what to do with “mass,” when equation wishes to explain that very mass as wave When we see the foundation of the new information theory, FIT, often we ask ourselves, are all these new?

10.4 CONSCIOUSNESS IS NOT ON THE NEURON SKIN—TIME CRYSTAL MODEL IS NOWHERE BUT EVERYWHERE

If brain is not a computer and not a Turing machine, then what?

“These words information, data, rules, software, knowledge, lexicons, representations, algorithms, programs, models, memories, images, processors, subroutines, encoders, decoders, symbols, or buffers do not exist in the brain.” Such statements flood the internet, but no one tells us, what are the words true for the brain.

Our journey to explore the synthesis of an artificial brain started with microtubule, its language is GML, its resonance frequencies revealed PPM and Hinductor H is its replica. Microtubule is the gateway to the understanding of the brain, thanks to its water channel inside. It is not the only component responsible for consciousness, but, just like **DNA holds the key to genetics and evolution, microtubule holds the key to thermodynamics and acquired information by a living system**. However, microtubule has never received the honor it should get, in spite of its magical contributions, throughout the entire living species in the planet. However, we feel that there is a bigger problem with our overall approach to biology. Our perception regarding the information is holding us back and if we do not know what information in the Nature is, we know nothing. We always get an answer to a query, but, the form of the question determines the nature of the answer.

We think there is always an attempt to see proteins and any biosystems like a transistor or a switch, as if from proteins to brain everything is a circuit made of elementary electronic devices. We blindly force the biological systems as if they are electronic devices found in the conventional

electronic shops. Design experiments accordingly, and undoubtedly get the results satisfying our faith. It is not only a very wrong idea for the common people; we would find such an erroneous understanding even in the scientists. A Google search would get us several breakthroughs in Nature and Science journals suggesting that the protein is a transistor and a switch and like OP-AMP. So many varieties of biological systems are there and without investigating what those devices want to do, we carry out simple experiments to tag them as a handful of known devices used in electronic chips, it has become a religious faith now. In addition, if some scientists want to seem radical, they tag it as a quantum system, one mystery to support another mystery. Therefore, the mindset masks the true quest, “bits” has not impacted “in a bit” but in a massive way to the free thinkers.

We would also see that there are two groups of peoples, one that believes that our brain is a computer, or brain is a Turing machine. In addition, there is another group, which suggests that the brain is not a Turing machine, but do not tell us what is that unknown device actually the brain is or the biological system represents. Opposition to mainstream should be done sensibly. Toppling the world of “logic” that started with Bertrand Russel’s “principles of mathematics” in 1903, is not so easy or fun. Criticizing the mainstream science is good but not without an alternative in our hand that is concrete. Those who challenge the mainstream science (the brain is a computer, a neuron is a switch, all information processing happens through the skin of neuron body or membrane, but everything inside the neuron is just a blank, a neural network is a circuit etc), they are mostly not serious. If the brain is not a Turing machine, then tell us what that elementary machine is? Well, *in the last 100 years of development of logic, no one talked about making decisions without “logic.” The inverse of “logic” is “illogical” which means “nonsense” to us for the current science. Making sense in an illogical way is the way to go.* But the question is how?

10.4.1 THE DIFFERENCE BETWEEN A NEUROGENIC BRAIN MODEL AND A TIME CRYSTAL MODEL

The difference between neurogenic brain model and the time crystal based brain model (Figure 10.3) is a journey that started with the microtubule research. Microtubule showed the way to PPM-GML-H triad. The biological systems while building living machines, does not make a switch or circuit, it wants to make a clock inside a clock inside a clock.... in a nested structure. The wiring we observe in the brain and at several biological structures is an illusion; every single biological machine is a PPM driven musical instrument. Unlike Tuning forks, they have several fundamental resonance frequencies, and they select those frequencies to play music, and

those musical notes are such that they represent geometric shapes and information, so it is not harmonic, but an anharmonic device. The discovery is not “simple” as it appears. Just imagine, music representing banana and apple is being played in a device as two simple pieces of music in a loop, then if one activates an apple by synchrony or resonance, the other is played. Thus, ***there is no reduction of decisions like we see in the logic gates and hence “time crystal” to replace “bits” and “qubits.” There is no collapse, no finiteness, projection from infinity morphs in a way, they system cannot even define the decision received from infinity via feedback.*** Consequently, PPM and GML are what we learned from microtubule and applied to the entire human brain. Thus, we reject “bits,” or “qubits,” we say that the experiment suggests, that we should not be debating whether the brain is a quantum or classical or chaotic, those concerns are irrelevant, debates are unnecessary. There is something much more interesting and profound, that is the true nature of the information. “Time cycles” as suggested above get nested, we have verified this in neuron cells, furthermore in at least 7 proteins.

The discovery of universal time crystals in microtubule, protein and neurons has led to “fractal tape” to replace the “Turing tape.” A very simple decision, “every single cell of a Turing tape has a Turing tape inside,” this statement alone collapses the foundation of Turing machine. Several proteins “tubulin,” actin, beta spectrin, ankyrin, clathrin, collagen builds time crystals as magnetic vortices to explore the role of electromagnetic resonance frequencies. We found that they have a composition of resonance frequency bands, where prime number of frequencies shift together as a group (see [Chapter 6](#) for details). Mostly we found triplet of triplet bands that connects all proteins and components in the brain, self-similarity is not in appearance but in the vibration. The brain is a clock inside a clock inside a clock... there is no end to it, though we format it in 12 imaginary worlds (dodecagons) one inside another. The particular finding changes the basic understanding of the brain. The old belief that neuron skin or membrane does everything falls apart. Neuron skin is just one of 500 different types of cavities that we have in the brain. Microtubule is also one of those 300 types of triplet-of-triplet systems vibrating in the brain. *Therefore, the cavity inside a cavity inside a cavity makes a resonance chain which is best arranged in the form of a frequency wheel is the machine that creates rhythms to operate.* In summary, we have not restricted ourselves to the microtubule alone, or single protein studies, or even to a few live neuron cells. Primes of all the brain components nested together to build vibrations, so no brain component holds consciousness ([Chapter 7](#) for details), its space-time-topology-symmetry metric that governs decisions. We have built a series of technologies like atom probe, noise free electrode system to see what

is happening to a single cell when we see them simultaneously using various probing clocks ([Chapter 6](#)). **With 26000 proteins and more than a few hundreds of different types of cavities, we have engaged in building a comprehensive clock architecture of the brain-body system that would act as key to the future massive brain building projects:** We cannot understand the dynamics of a river by mapping the wave shapes of ripples on its surface, mapping neurons would tell a little about the river of consciousness. One cavity, the neuron skin can take 100 billion new forms ($2 \times 3 \times 5 \times 7 \times 11 \times 13 \times 17 \times 19 \times 23 \times 29 \times 31 \times 37 \times 41 \times 43 \times 47$) in 8 billion humans, mapping all neuron geometries would not tell what our brain is. However, we realized only way to go forward to let one cavity say neuron geometry to come under the influence of trillions of cavities below and millions of cavities above, and evolve geometry in 10^{12} ways, then, information about music will let the neuron to dance, and that would be the way to understand the information processing in the brain. We understand that developing GML, fractal cavity resonator model of the brain, doing experiment with neurons, proteins, complexes, and neuron clusters are not simple and easy task. However, if one models it properly, we would be able to give the world of science a new way to look into the basic understanding of information. Only then perhaps people would understand, that the basic definition of information re-defines everything. The transition from “bit” to “universal time crystal” and providing every single cell of a Turing tape to hold a tape inside could transform everything we know about the operations of a biological system.

10.5 WHEN WE CARRY IT AND WHY WE MAKE IT

When one does requires a truly bio-inspired computer? Biological clocks are well known in the brain. It extends from circadian rhythms to the single neurons. The connecting protocol and the route that connects the rhythms or clocks are unknown in biology. Currently, rhythmic activities are linked as a chemical process associated with proteins and enzymes. The network of clocks in the protein-like nanoscale biomaterials does not terminate at the neuron level, as it was believed thus far. The rhythmic or clocking reaches deep down to the few atomic groups. Triplet of triplet resonance band connects the Peta Hertz (femto seconds) to the nano Hertz (12 years) frequency scales (Ghosh et al., 2014a, 2016a). The resonance pattern looks similar to the pattern of primes derived from the resonance of the dielectric resonators. There are many carriers ([Chapter 7](#)). All carriers resonate with different dielectric resonators Lauber et al. (1994); Pistoletti and Manini (2000); Pechal et al. (2012); Lee et al. (2011); Joshi and Xiao (2006). Yet, the frequencies constitute a singular pattern.

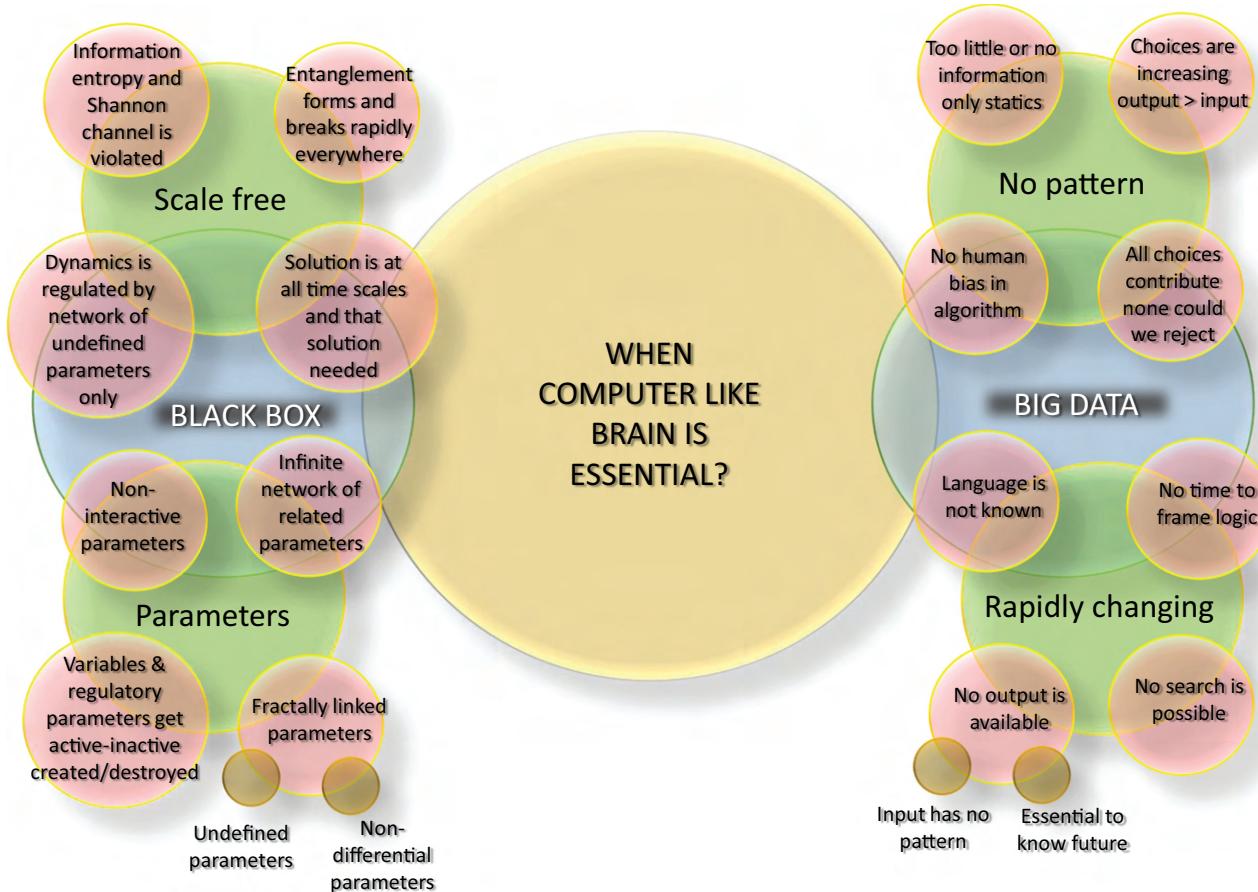


FIGURE 10.4 People used to build a brain-like computer, now humanities need computer like artificial brain. The necessity is outlined here.

Ten situations when one should use this non-computer: The objective is to develop a science for non-computing, to make decisions where architecture of confusion operates and obviously the Turing computing fails. Here we note 10 circumstances where non-computing is essential (Figure 10.4).

- (i) Information is not sufficient or organized to frame logic.
- (ii) No time is available to find the rules for structuring logic, i.e., the urge for an instant reply.
- (iii) Rejection of choices is not advisable. The rejected choices could take over the lead anytime as the dominant player.
- (iv) The database is too big to structure it into a format solvable by a futuristic quantum computer. It requires to “search” without searching, i.e., spontaneous reply.
- (v) The decision-making devices of the future cannot carry a giant megawatt power supply continuously. Thermal and electrical noises are the only energy sources.
- (vi) We encounter a system that uses an unknown language, cannot

be understood at all. (vii) Learning the real parameters using which a system configures its response. Complete rejection of black box approach, to unraveling the true dynamics. (viii) A large number of parameters are being born, disappear, change, and redefine itself with a truly random, chaotic fashion. When, even the variable parameters could not be identified. (ix) Undefinable factors govern a situation. A factor has several sub-factors. In addition, each of those has several sub-sub-factors. Thus, the logical statements inside logic inside logic perpetuate into an endless network (Gödel, 1938). (x) Computing is always a reduction of choices, but in morphing, it is just the opposite. There is a continuous increment of choices, output is more than input and that defines non-computing. The difference between the Turing-based computing and the time-crystal-based computing was discussed in many parts of the book, here is a summary to refresh in Figure 10.5.

Turing based computing	Artificial brain	Physically wired circuit	Temporally wired circuit
Device: logic gate	4 th Circuit element, Hinductor	Junction & branches	Topology & symmetry
Energy: Power supply	Noise, light or em wave	Device edits speed of flow, amount, density of channels	Device edits phase, amplitude & duration of a ripple
Computing architecture: Boolean architecture,	Phase prime metric based geometric architecture	Geometry of path, physically governs time.	Geometry of hierarchical ten dimensions arrange clocks
Physical variable: electron	Knots of darkness, magnetic particle	Directional processing	No direction, symmetry similarity
Data structure: bits	Time crystal	Quantity of information = amount, power consumption	Set of symmetry transfers = fixed power consumption.
Channel capacity: bits/second	Time bandwidth per symmetry	Device inside a device inside a device concept, not possible.	Clock inside a clock inside.... Infinite net glued by singularity.
Information unit: logical statement	Time crystal triplet, subject-clause-verb-adjective	Without entanglement no simultaneity, all step by step.	12 imaginary state (dodecanion) controls simultaneous operation.
Hardware: Circuits	Hardware: fractal super molecule	Electrical/optical insulation	Superlensing insulation
Software	Geometric musical language	3D orientation of device, packing is not important.	3D orientation & packing devices inside a cavity is a must.
Dimension of data: 1D	10 Dimensional data	Linear stream of signal	3D projection of time crystals
Mechanics: classical/quantum	Fractal mechanics	User designs circuit using free will	Metric of prime auto designs
Data processor: Switch	Clock with phase singularity	Cannot hold circuit of time.	Circuit of time edits physical wiring



How the decision looks like in a brain?

Quaternary decision delivered has three layers, one could enter inside one element three times.

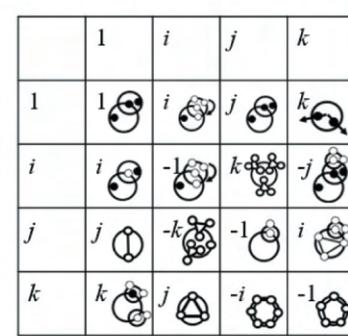
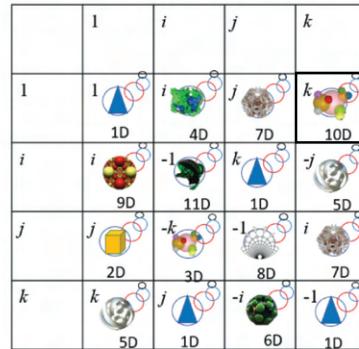


FIGURE 10.5 The difference between the Turing-based computing and the artificial brain made of fractal tape, operated by time crystal-based language (left). To the right differences between a circuit made of hardware elements and temporal elements like clocks and singularities are outlined. To the bottom manifolds representing the 11D dodecanion tensor's many world impacts are built by cutting pieces of papers. To the bottom right, two quaternion tensors are presented, the left tensor is made of 11D data and if one time crystal is zoomed then a new tensor is found shown adjacent right to it.

10.6 HOW TO CUT 11D MANIFOLDS OF TIME IN A PIECE OF PAPER

The most important question using which we started the book is that how human thoughts look like. Now we know that it looks like a dodecanion manifold described in [Chapter 4](#). However, one could really cut paper and fold it to see how the artificial brain thoughts would look like, it's a 11D manifold ([Figure 10.5](#)). One very important point needs to be clarified regarding the manifold. Of course a human thought is expressed as a quaternion but the elements are made of time crystals of various dimensions. One could zoom one element and expand that to find that each element is also a quaternion whose elements could be a time crystal of various dimensions ([Figure 10.5](#)). Therefore, the paper of Turing analogy is the perception that is projected to the other human we interact, but two factors are always common, data is 11D or dodecanion tensor but always presented as a quaternion form for linguistic reasons.

10.7 THE MARRIAGE OF PRIMES WITH GEOMETRY WOULD RESHAPE HUMANITY

How to picturize a PPM in the real universe: (a) Argument in an argument in an argument in an argument... this goes on and on forever (information expression). Replace one argument as architecture of confusion in the form of a fractal network. (b) The clock inside a clock inside a clock inside a clock inside a clock... this goes on and on forever. (Frequency or energy expression). Just one clock in the form of a fractal network. (c) Oscillator inside an oscillator inside an oscillator... this goes on and on and on forever (hardware expression)...Just one oscillator in the form of a fractal network. (d) A waveform inside a waveform inside a waveform inside a waveform. It goes on and on and on forever (continuation expression). Just one waveform in the form of a fractal network. (e) A rhythm inside a rhythm inside a rhythm inside a rhythm... this goes on and on and on (decisional or computational expression). Just one rhythm in the form of a fractal

network. (f) Turing tape inside the cell of a Turing tape... this goes on and on and on (machine expression)—just one tape in the form of a fractal network.

So, I have often made a hypothesis that ultimately physics will not require a mathematical statement, that in the end the machinery will be revealed, and the laws will turn out to be simple, like the checker board with all its apparent complexities.

Richard Feynman, The character of physical law, 1974

Derivation of physics laws from no laws: Wheeler advocated to derive physics laws from no laws (Wheeler, 1980, 1983a, 1985), his PhD student Feynman was no different as we have seen in the above quote. As the computational capability of massively parallel supercomputing architectures is increasing linearly for the last half a century, thanks to the boons of Gordon Moor's law, researchers at the singularity university have got a fantastic game of “predicting the future of mankind.” Any parameter they plot defining a particular feature of the human civilization starting from economics to medicine turns out to be linear. The total number of tooth-brushes used by human race per decade to the development of every single technology we can imagine, falls into the category of linear development. One should strongly object the argument that these are nothing but an artifact created by a clever choice of representing parameters. Even if we consider that some tricks have been used to modify the representation of parameters, so that it looks linear, we cannot ignore the fact that existing civilization is monotonous and humans are not playing with its technological fundamentals. If they could, it would not have been possible to convert any parameter to such a linear form. While we do not rule out the argument that it is possible in principle to draw a straight line even on the surface of a stormy ocean, it is however impossible to generate products through a linear development by adopting the technology of “simultaneity.” When we ignore symmetry in a stochastic fluctuation, everything could be linear, but the inception of “simultaneity” would induce non-linearity even at the plank scale which cannot be manipulated. We manipulate complex patterns from the stock market to astrophysics in such a manner as if at a time only two bodies exist and then try to ignore the very parallelism at the local scale in the quest for finding a global relationship. Unknowingly we, the human race, oversimplify everything that happens around us using only one principle, “complete destruction of parallelism.” It is the reason, linearity is everywhere, yes, we are arguing to change the practice of mathematical formulation by nested clock approach that potentially more suits to address simultaneity.

We fail to recover this information because sequential expressions create a strange world; one can make millions of innovative and creative ways to create those alternate worlds similar to reality. However, every time, failure is ensured by the attempt to recovering the data following a linear process. Recovery of the lost data should start with a pattern itself,

a seed argument that contains an arbitrary set of information queries, however all queries are coupled in a particular way. The particular chain of coupling that links several other arguments is not an expression, but again another set of patterns. The bottom line is that to survive in this universe with original information, we must not speak, avoid any step that is sequential, and preferably draw images capturing all associated information within its frame.

The dangerous philosophy of black box practices:

Currently the accuracy of computation is defined by the size of clusters embedded in the supercomputer, i.e., the amount of money invested. The research group which gets more money would derive a solution with better “resolution.” The reason is very simple. When we couple the small two particles boxes “dangerously,” then to compensate we come up with successive courses of never-ending manipulations. When we attempt to model nature, we simply try to find the global weight of a parameter in an equation. The equation means we have a left hand side equating to the right-hand side. We prefer to keep a parameter lonely in the left-hand side, which will be determined by experiment. In the right-hand side we keep all fundamental variables that generate the left-hand side; the right-hand parameters can couple between themselves in various different ways, like a square of the first one, the logarithm of the second, sinusoidal function of the third, etc. The history of science is basically a documentation of arguments on proper placing or weightage given to the parameters embedded in an equation. Arguments and counter-arguments on the constants used in the equation were paramount in the last century. A close correlation through the feed-forward network between experimentalists and the theorists has made the expressions perfect in explaining the experimental output. An experiment is a process, by which the effect of all system variables is nullified except the measuring one.

10.8 MACHINES OF THE FUTURE

10.8.1 THE DIFFERENCE BETWEEN CIRCUITS OF WAND CIRCUITS OF TIME

A comparative study between time crystal computing and artificial intelligence: Linearization of events is not accurate: Artificial intelligence has thus far considered that all events could be expressed as a sum of a series of elementary sub-events. Here in natural intelligence the events are not linearly connected. They are intricately connected by phase in 1D, 2D and 3D geometries. It means, if an event has several parts, their intricate relationships are neither in series nor in parallel. A temporal 3D wiring of sub-events exhibiting 11D dynamics is a reality. When one tries to draw the connections, 3D phase wiring should remain intact; one cannot draw it on a 2D surface. Every corner of this geometric wiring of events is important. A corner holds a unique geometric structure inside that is also a 3D network of sub-events. A singular change in this worldview changes everything in the Turing information theory. Consequently, the whole research field of artificial intelligence is redefined into natural intelligence.

Why does this little change affect so much? When all events are considered as a 3D wiring of sub-events, then immediately all events turn unpredictable, just like quantum (Durr et al., 1992). Say, one is looking into a complicated 3D network. It would appear differently in different directions. Now, the second problem is even more serious. Every event has a 3D network of sub-events inside. It means, there is an infinite journey for any observer who wants to find out the basic event that gives rise to all other events. It is a disruptive idea. One could immediately notice that an “event” becomes an undefined function. The third immediate effect is that an observer has to limit its sensing time width between limits. It is not like cutting a tape, it is cutting a 3D rock. If the lower limit is cut, even after cutting the rock appears as the same. Thus, an observer recreates an event. First, by finding a suitable orientation around the 3D event architecture. Second, by locating itself wherein the infinite journey, it would fit. Finally, to sense it, cutting off the event architecture based on the observer’s own time limits. We have detailed these discussions in the [Chapter 5](#).

10.8.2 FUTURE APPLICATIONS

Future applications of a brain jelly based human brain are outlined in [Figure 10.6](#).

(1) **Musiceuticals (musical + pharmaceuticals):** Vibrations could rectify the misfolding or unfolding of proteins (Sahu

et al., 2014) or activate new age chemical bots (Ghosh et al., 2016b). (2) **Increased human sense bandwidth:** PPM restricts the time-bandwidth of a brain like a computer. By harnessing the PPM, mathematically, human ++ intelligence could be developed. (3) **Halt aging-related processes significantly:** Editing age requires a true PPM hardware to feed cells with real vibrational data. The hardware would correct the clocking errors in the age-related proteins and complexes. (4) **Understanding of the language of natural events like the beating of earth’s magnetic field and every life form:** GML is a universal language. It could be scaled up to replace the fitting with a black box, equations, to a group of patterns explaining fundamental physics theories (Feynman, 1965) (Sahu et al., 2009, 2012). (5) **Developing a truly dynamic model where we cannot find any logic:** e.g., earthquake, weather change, the evolution of a virus, aging, side effects of drugs, dynamics of gaseous clouds, etc. Non-computing hardware learns higher-level rules. Thenceforth, it bridges the missing links in the information architecture and spontaneously simulates the future instantly. It can morph events much better than the previous cellular automaton based architectures (Bandyopadhyay et al., 2010b; Sahu et al., 2009, 2012). (6) **Science of human behavior, society, economics etc:** The psychological behaviors, emotions, and other non-defined parameters would be geometrically defined (Wegner, 1997). One would get a geometric pattern of clocks from the human responses. (7) **Simulate beyond limit or knowledge:** Once built, a PPM hardware needs very

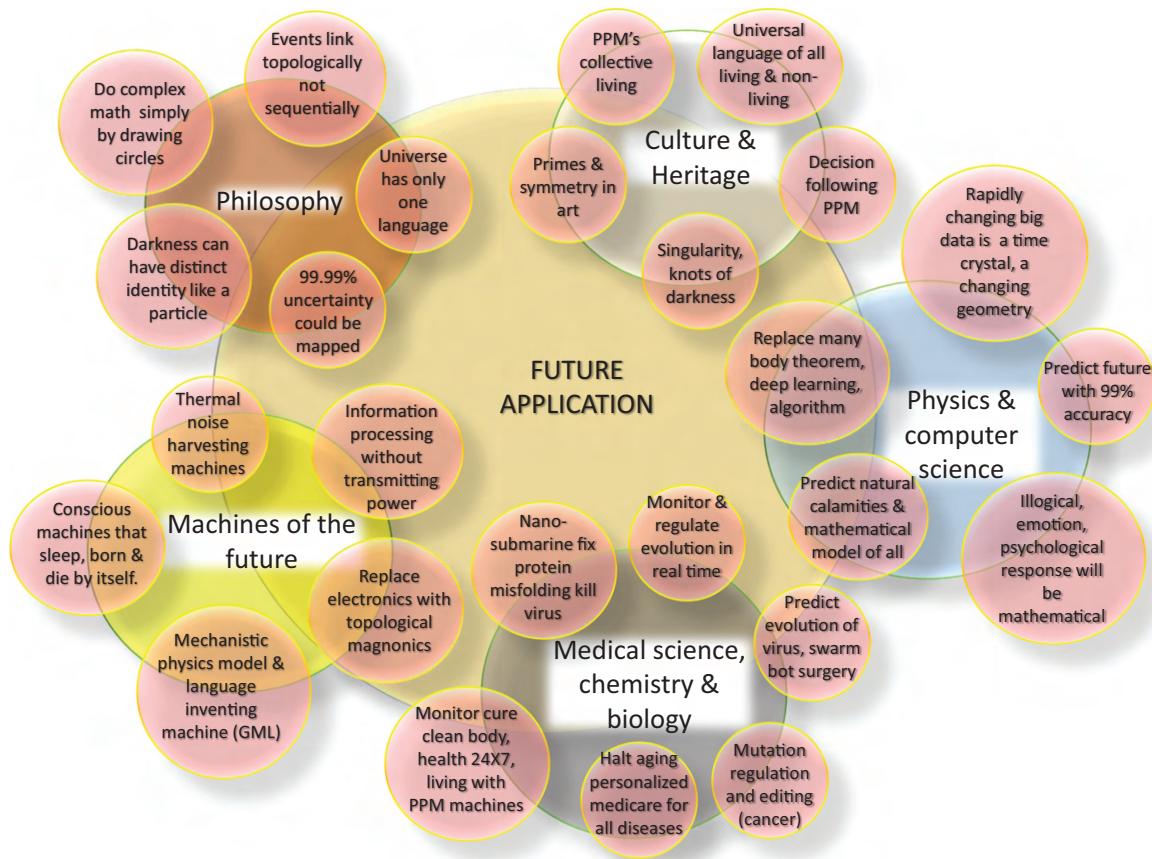


FIGURE 10.6 The future applications of the artificial brain in different research fields.

little gross information about any event. Then from that little information, it generates dynamics at time scales that it has never encountered in the past. (8) **The noise would replace signal, enter into the era of ultra-low power:** Earlier, scaling up was like adding more resources, faster speed, more power, etc. Now, it is all about how one could make a device that captures a much longer slice of PPM. (9) **Predict and simulate' million-year evolution in' a finite time (the science of evolution):** Currently there is no tool to estimate evolution because this is a slow process. Non-computer, by using GML and the PPM, could project a far more reliable picture of the future. (10) **Machines of nature:** The PPM, by intimately interacting with nature, can design scientifically life-like machines, it could be an architect.

Among various laboratories across the globe, several products of similar nature are being developed, we have categorized them into ten classes and outlined them in Figure 10.7. In Figure 10.8 we have outlined some of the primitive instruments that were the foundation of building time crystal map of

the human brain (Chapter 7) and the brain jelly to implement that model and build an artificial brain (Chapter 9). The first instrument is a dual study of patch-clamp and coaxial probe, Ghosh et al. saw live in 2008 that neuron firing is outcome of signals in the microtubule strings deep below the neuron. The second instrument is the detection of time crystal using a simulator called time crystal analyzer. The third instrument is quantum cloaking discovery, the path how in the random mess of fourth-circuit elements, only the desired devices see each other, others go silent. The fourth instrument is for seeing magnetic vortices using a modified quantum entanglement measurement set up. The fifth and final instrument was regulating organic nano brain using an antenna.

Ten features that constitutes frequency fractal computer distinct [The proposed hypothetical name is AjoChhand- *A* = Advanced, *J* = Junction-free, *O* = Organic, *C* = Computer, via, *H* = Hierarchical (higher level), and *H* = Heuristic (without programming), *N* = Nanobrain, *D* = Development]: (i) It never performs a search yet finds

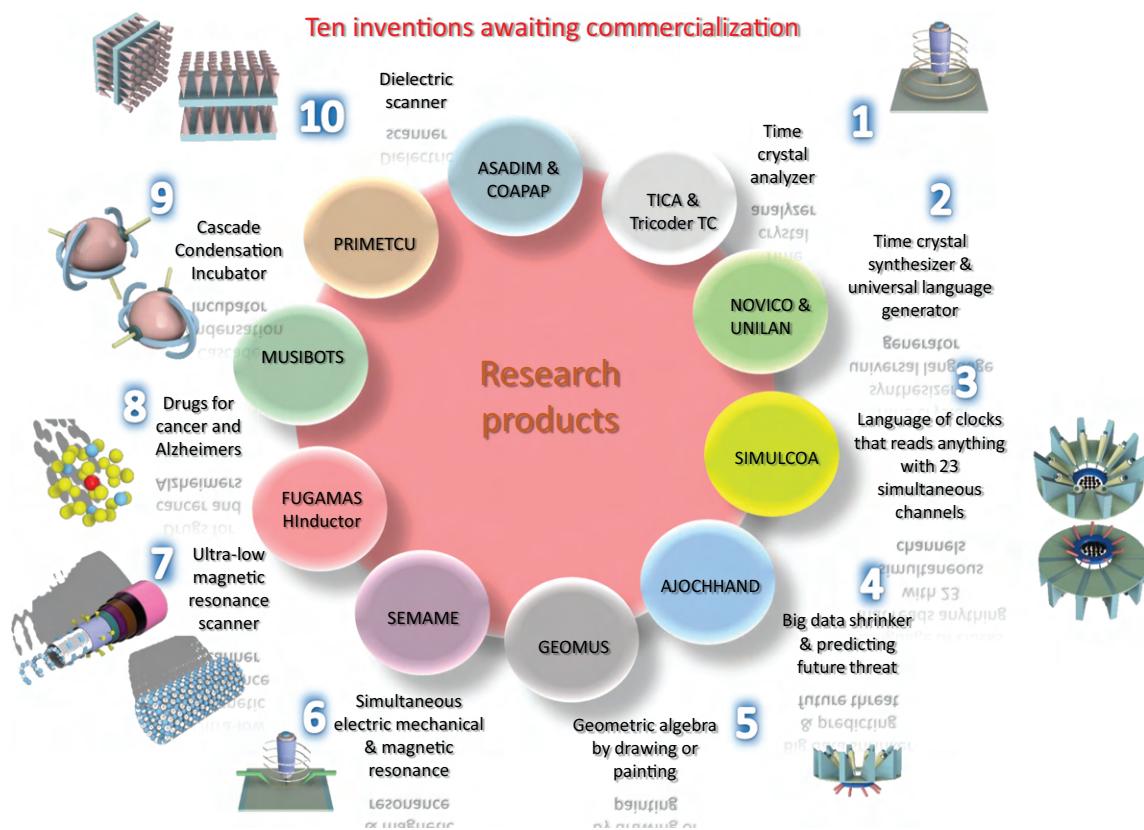


FIGURE 10.7 Conventional characterization systems do not work if we change the information theory, so we need new generation instruments. (1) TICA and tricoder TC: Time crystal analyzer, if one touches a protein or biosystem instantly reads the time crystal inside. (2) NOVICO and UNILAN: Reads any big data that is changing with time rapidly and using geometric musical language (GML, Chapter 2) converts into geometric language. (3) SIMULCOA: Coaxial probe-based 23 channels can read the signals from proteins simultaneously. (4) AJOCHHAND: The simulator converts rapidly changing big data of any size into a changing topology. (5) GEOMUS: We have developed a new kind of algebra where we need to draw circles and simply by drawing it following certain rules, complex infinite series calculations could be performed. (6) SEMAME: A unique experimental setup for simultaneously measuring three resonance frequencies, electric, magnetic and mechanical following $(e^2 + \Phi^2 = \pi^2)$. (7) FUGAMAS: Our fourth-circuit element namely Hinductor. (8) MUSIBOTS: Musical robots that can destroy cancer cells and cure Alzheimer's. (9) PRIMETCU: Cascade fractal condensation where simultaneous self-assembly takes place at several spatial and temporal scales. (10) ASADIM and COAPAP: Dielectric scanner that vibrates with a piezo motor to instantly capture an entire image (all pixels at a time).



FIGURE 10.8 Different experimental setups where the data were produced for the artificial brain material characterization are shown.

what it seeks (**no search**). Search a massive database without searching (spontaneous reply). It never acquires a true input; it has all possible input elements already inside as part of the GML. So, it searches for them outside, thenceforth, a spontaneous reply is its operational key. (ii) Multiple nested clocks one inside another enable “a virtual instant decision-making,” It **runs 24-7** as it evolves its wiring by itself for learning driven by PPM, a computation never stops, solutions are sent periodically, “halt” means observer’s prerogative to shut acquiring a solution. (iii) It does not have any software program (**no software**). No programming is required as “cycles self-assemble/dis-assembly for better sync at all possible time scales simultaneously.” (iv) “Phase space” keeps “volume intact” as required resources only increase the phase density not real space. Computing power is not related to energy consumption, there could even be a negative consumption; It shrinks massive information into a small geometric clock assembly or a seed of time crystal. It follows a unique superposition of 10 classes of PPMs, each sub-metric represents a set of unique geometric patterns to link events. (v) Perpetual spontaneous editing of slower time cycles (creation/destruction/defragmentation) “prepare for unknown” = higher-level learning. It introduces “fractal resolution,” a complex signal’s lowest and fastest time scale signals are absorbed. simultaneously, and during expansion, the fractal seed delivers full output, from a seed of information

(drastic shrinking of data). (vi) It runs by **white noise**, better randomness in noise is preferred. It uses an ultra-low power; only to manage re-wiring, non-computing does not require power in principle, as there is no reduction, no collapse, and no junction. (vii) The superposition of simultaneously operating a million paths assembles into a sphere enables “extreme parallelism.” In quantum, only one Bloch sphere, here sphere inside a sphere inside a sphere... It explores **singularity** and used fractal mechanics, nothing to do with classical or quantum. (viii) Time cycle is the memory, rotation along the cycle is processing, are same events, “no transport needed between memory and processing units,” no wiring. **No wiring**, a completely wireless connection of vortex fields. A wireless connection to process geometry at all the time scales is allowed in the hardware simultaneously. (ix) No logic gate, no reduction of choices, which ensures that “speed” is irrelevant. The computer is made of one element only, **clocks**; considers only parameter phase. It considers only parameter phase, emulate mass, space and time to process information. It expands the input information using PPM, hacks nature to predict a gross future. (x) All sensory information is converted to one geometric language that allows “perception,” a yellow color could have a taste. Perception is not programming as wrongly perceived. It has a unified **homogeneous fractal** hardware for everything, learning changes them.

10.9 PLAYING WITH CHEAP, HANDY TOOLS TO BREAK THE PARADIGM OF THOUGHT

Will the unknown remain unknown? Exploring a Science Fiction in the making: Artificial brain won't be a real computer, but we are making a user. The computer runs by itself. But then, who is the original driver? The metric of primes created by Reddy S. et al. exclusively for the computer, runs the show inside its core hardware. What is the metric? And why a metric would have the power to do remarkable things? When we work on building a metric, like good old days of astrophysics, PPM-GML-H protocols also becoming as religious entity as a Turing machine. In astrophysics, theoreticians used to have a space-time metric, while doing complex math, students used to refer to the metric time to time and retrieve all essential data to solve planetary problems. Similarly, for natural intelligence (AI) we explored here a new metric of primes, namely space-time-topology-time. The idea is to hack nature and make a computer that can generate most patterns that we see in nature, so that unknown is known via PPM. How to perfectly build an effective prime metric architecture, or how to advance our primitive conscious bot ([Chapter 9](#)) is to be a matter of investigation for a longer time, but it cannot be ruled out that the concept to use a prime metric as a prime decision-maker is a new concept altogether. Self-awareness would require post-mortem of PPM-GML-H prescribed here.

The existing information theory is based on the idea of the known. FIT, (Fractal Information Theory, [Chapter 2](#)), wherein tools are there to bridge two known domains through an unknown path. It is an important change from the era of information theory that was existing for the last century. What is the trick that I know the unknown? We can do it if we build a universal metric that keeps all possible solutions, just like the space-time metric that is being used for nearly a century with little modifications to discover a new and new physical phenomenon that was never known. If we are not surprised how a space-time metric discovered in the 1920s is able to provide us new and new discoveries over a century, we should not be surprised that a similar metric for natural intelligence a 11D space-time-topology-prime metric would trigger another revolution. Of course, this is not a known culture in AI, but we feel that people would get accustomed to this culture of building architecture of confusion in day-to-day life.

Imagine we have two parts of music, and we have a kit that would combine two parts of the music with a new one in the middle, and that new music would make a sense to our mind. Similar things would be true in handling large data, it would generate unseen patterns in the big data. The reason we would like to inspire readers to build a DIY kit so that every people in the world could get free access to the information revolution knowing nature as it is. Why not seeing the share market using time crystal, build chatbots for the olds and deserted, build machines to give birth to new machines!!!

The beauty of PPM based computing is that we get the total picture at once. Then, more the time pass by, more the information arrives, from 50% reliability to 66% reliability to

72% reliability to 76% reliability to... the journey moves on toward 99% reliability, beyond which not possible to achieve. What brain jelly does is absorbing the dynamics related to new primes. Absolute reliability is a trademark of the existing computers, but for PPM-GML-H triad, "zooming the unknown" as a function of time and more detailed input is the key. The artificial brain would be a toy to change the perspective of this world, not step-by-step, rather, within and above. Not just playing a game, if we are in an unknown territory about which we have absolutely no information, then, the product computer or user can provide a good overview, instantly with 66% success rate. Uncharted territories are increasing every day with the data explosion. If we humans do not have a technology to estimate what is there in the uncharted territory, we cannot do anything. Accidents would create massive havoc on human society.

1. Imagine a virus is silently evolving into a dangerous species. Some prime metric hardware is there to perpetually track the development of the virus evolution and perfecting the prediction to monitor its evolution. Thus, it could estimate the terror threat well in advance.
2. From the Microwave background data of the universe, it could estimate the structure of the universe partially.
3. From the massive data flow of the internet, it could find patterns of threats, like cyber attack.
4. It can monitor and predict all possible climate change, where the future predictions are not possible due to complexity.
5. It can monitor individual health over the years and learn about individual health crisis well in advance. Typical health problems exclusive to a person could be identified and cared.
6. Economics will become a scientific subject of study as the computer would build predictable models perfecting it over time.
7. Social science and psychology will become a scientific subject as verifiable predictable models would be there, that could be rejected or accepted by logic.
8. General science would get a tool to study the absolute property of a system, not a fitting model, thus, even scientific studies would get a better cross checker of its conclusions.
9. Evolution of life could be tracked scientifically, not just in the past, but also the future to be predicted.
10. Lifelike machines of the future will come, which would have their own operation lifetime and after a certain time, they will die just like living systems.

10.10 NUMEROLOGY OF HUMAN CONSCIOUSNESS

We have summarized all the important numbers that we encountered while presenting the formation of brain jelly based artificial brain or developing the time crystal model

Number, N	Mathematics	Physics	Biology
4, 8	Quaternion, Octonion, Lie algebra	Continued fraction geometric algebra, CFGA	Class of sensors enable
12	Dodecanion, 144 elements tensor with 11 imaginary states	Topology begins, triangle, three points are 2x2x3, 3x2x2, 2x3x2	No of thoracic nerve, cranial nerve, thalamic body, nucleus of hypothalamus
19 ⁴	Elements require to build dodecanion	H elements required for building an H3 device	Cortical columns form H3, nerve bundle, hippocampus layer
47, 15 th prime	The last prime that builds distinct metric	Eisenstein prime with no imaginary part	Cortex operational region, Brodmann's soma domain.
2x3x5.....37 ~10 ¹² or up to 47~10 ¹⁴	99.99% cover of all factors in the integer space.	New symmetries become <0.01% in the available options	Elements repeat as single element start new counting for new device
11,17,23,29,37,41	Silent primes	Groups define statistics	Various brain components
2,3,5,7,13,19,31,43	Active primes	Groups define symmetry	Various brain components
12N, 24N, 48N, series, abundant in nature	24N, 12N OF>>N, ordered factor, at 48, OF =N for first time	Degenerate solutions ensure fractal mechanics	Truly intelligent & high level perception
174000	43-47 pairing ends, 47 takes over	Minimum H device required to cover 99%	Number of neurons in 1 of 47 cortex regions
1,2,3,5,7..47	Metrics are explicit	>48, primes are masked	C4H7O2N=48/101 life=48 carbon

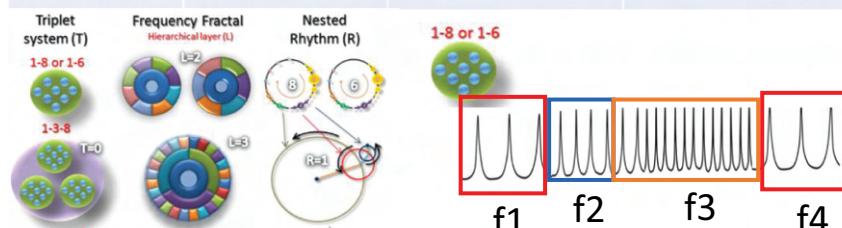


FIGURE 10.9 Important numbers that were found abundantly in nature and in the brain. Below, the formation of time crystals of primes is shown using simple resonance bands and the clocks nested with each other.

of the human brain in [Figure 10.9](#). From biology to mathematics, the emergence of a few numbers, especially primes in the human brain, have been astonishing. They may be accidental or mere coincidence, it does not matter, a good summary would refresh readers mind about how the brain adventure unfolded.

The pattern of primes in the life and culture: Twenty-three tonal patterns used in 10,552 versus of Rig Veda: During information processing, a large number of fractal seeds of time crystals are generated and during memory retrieval, they expand and create the entire image. It is incredible memory management, within a few numbers of oscillators we can encode entire complex architecture. Indian classical music has a concept called raga, each raga is a packet of seven frequency notes; a singer needs to sing low to high and then high to low frequency to complete a period. For thousands of years, these songs are perfected to generate a particular feeling in the mind of the listener the frequencies are changed by tiny values, feedback cycles run generations after generations (Ganeri, 2001). Often the singer expands the seed geometric pattern for hours in various styles to create maximum impact on the mind of the listener. The rigorous mathematics for the composition of such classical songs suggest a very similar behavior. With 47 notable sound frequencies (48 letters including

Om sound), each representing a meaning, the Sanskrit language was made, that uses the matrix-vector projection mathematical formulation to convert a word to include space, time, context, sexuality, the transformed word is used to create 23 different classes of rhythms in Vedas, based on tonal ratios (1:2, 1:3, 2:3, 3:5, etc), just like we did in [Chapter 7](#) for pattern recognition, tones recur cyclically at every doubling or halving the frequency (rhythm used to generate time fractals by Vedic tradition). Logic in Vedas is geometric (Yantra, Mandala), uses $3^p 5^q$ formulation (p, q are \pm , hence they made triangle upside down to construct Sri-Yantra) to create all tones (male), 2r is used as added dimension (female), together they make the universe (Nicolus and McClain), we found pattern of prime similarly and ordered factors provide universal fractal chain in [Chapter 2](#). Vedas used all arithmetic, geometric and harmonic infinite series using 2, 3, and 5, while notes make a packet of 7, still Indian musicians use rhythm packets of 17 tunes (in a loop of 18 bits), including all prime numbers up to 47 (prime = $6n \pm 1$). Fractional infinite time series (time fractal $f(t)$), were also used (e.g., 5–7 and 3–6 time series define Kalpa Bramha, 5–10 time series defines Universe as an egg i.e., Hiranyagarbha etc.). Nested rhythm as time crystal presented in this book was extensively used in 5000 years of Sanskrit texts, fastest clocks were even number of hymns,

chapters, words, letters were specifically chosen to make it rhythm inside a rhythm, entire book has to be a song, like the complete time crystal model presented for the human brain (Figures 7.14 and 7.15).

10.11 FREQUENCY WHEELS OF AN EVOLVING BRAIN

The PPM world starts from fractal tape, ends in the collective evolution of machines: A summary: Turing's world of computing considers every single element is complete in itself, just like that a "matter" is complete; nothing inside/outside is changing it. Completeness enables discrete and binary true/false argument to define it. We get a Turing world. The PPM vision has one argument, one energy packet, one Turing like tape, one clock, one rhythm, one oscillator that encompasses the entire universe, but if we enter inside any of them, we find millions of that inside, the journey continues forever, whether we zoom in/out. Unlike Turing, any "matter" is conceptually incomplete so we need matter+energy+topology+symmetry tetralogy to connect all matters inside and outside. The wheels of life presented in Figures 10.10 and 10.11 are combinations of both matter and energy.

Conserved energy takes the form of periodic oscillation or rhythm and maintains time, but each rhythm has rhythms inside/outside (Figure 10.10). We cannot isolate any small piece of argument from tape network, hence, no bits or arguments like true/false, that leads to no classical information content. Observer/user is also part of the tape network. Entire

rhythm net, or time crystal that encompasses everything is represented as a matrix of truth with infinite dimensions, no rhythm is ever destroyed, no choice is ever rejected. Unlike Turing, fractal tape (PPM tape) needs four new steps, resonate (with a rhythm), expand (self-assembly of rhythms), phase transition (of rhythms), and spontaneous reply (the rhythms). Self-similarity of shape/rhythm appears/disappears with time, as rhythms couple/decouple with other rhythms, changes the structural symmetry of matters to memorize a particular set of frequencies for a rhythm. The entire tape network is never-ending resonance chain of coupled matters that vibrate with rhythm, means, local rhythms vibrate as a distinct entity in parts of the tape.

Since observer/user is also part of the rhythms of the tape-network, it senses by perpetual local synchrony and de-synchrony with various parts of the tape, thus, its "sensing" not computation by the classical theory of computation. At the bottom part of Figure 10.9, when we summarized the numbers important for the adventure of the brain, we showed how vibrations that were mere a spectrum thus far have become time crystals. That journey continued in Figures 10.10 and 10.11 where we have increased layers of ET tape or clock inside a clock... and then made efforts to increase complexity one by one. The equivalent life forms that the time crystal model could represent is shown side by side. The idea is to suggest **possibly the billions of years of evolutions from a single molecule to the complex life form have been a journey of time crystals**. We see a catalog of

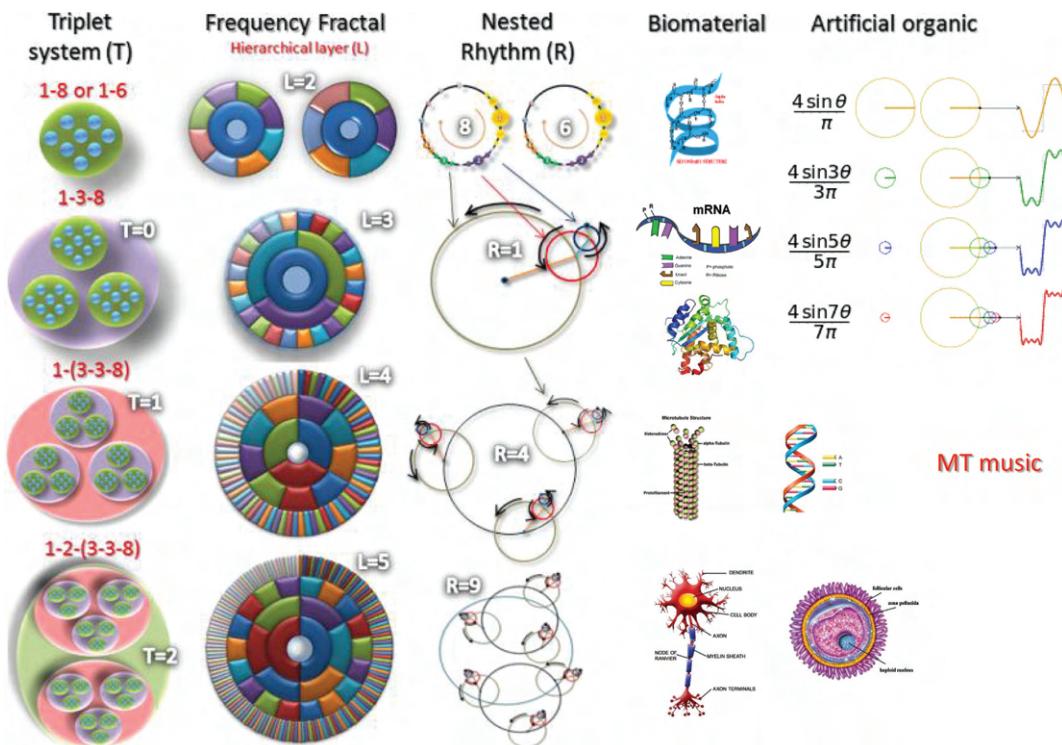


FIGURE 10.10 The first part of the Table showing step-by-step evolution of computers or decision-makers starting from a single time crystal. The first column shows 2D resonance domain, Second column shows equivalent frequency wheel, third column is a slice of time crystals showing simplified operation. Fourth column the equivalent biomaterial targeted to mimic.

Generalization of frequency fractal computer

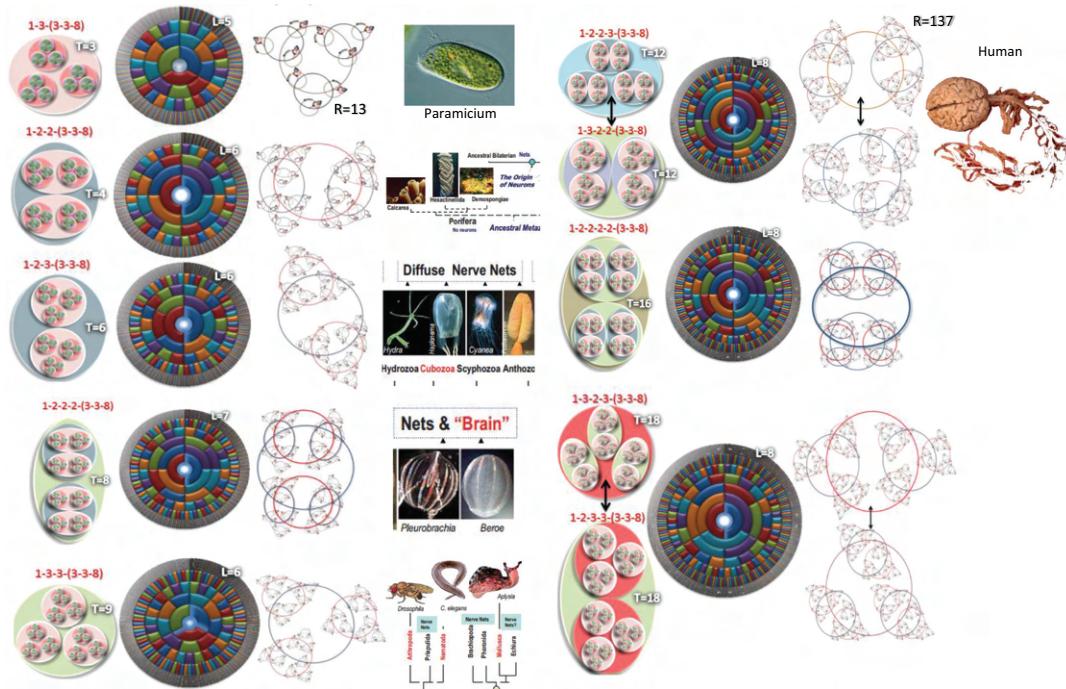


FIGURE 10.11 The second part of the Table showing step-by-step evolution of computers or decision-makers starting from a single time crystal. The first column shows 2D resonance domain, Second column shows equivalent frequency wheel, third column is a slice of time crystals showing simplified operation. Fourth column the equivalent biomaterial targeted to mimic.

life forms created by nature in the planet, maybe it simply added more and more clocks following the PPM described in Chapter 3.

10.12 SYNTHESIS OF CRITICAL BRAIN FEATURES EVEN BEFORE WE MEET THE ALIENS

We have created a table in Figure 10.12, where we have shown that if mathematics is the fundamental basis for human consciousness then, it would not be the last or only one kind of consciousness. There would be various kinds of consciousness. The human brain explored in the book could be represented by one integer, 12. Why? $2 \times 2 \times 3$ could be written in three ways, so a higher level geometry one could create. It means the human brain using 12 components, each of which could process higher-level decision-making (each component have 12 bands to operate), realize consciousness. However, the same could be achieved by $2 \times 2 \times 5$, possibilities are infinite. The table suggests how to build higher than human consciousness machines. Of course they would never be machines anymore. The most interesting is the case for 37 primes or case of 36, then higher-level geometry that makes human conscious as per the definition of current discussion would make a truly higher conscious alien whom, humans could not even understand.

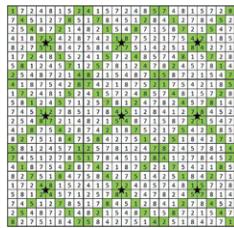
Projects similar to PPM computing: There are plenty of brain-building projects, some of the projects do consider nested networks and interference as a tool to reach the goal

(Ersatz brain project, J. A. Anderson), not only that the fractal analysis of neurodynamics does provide greater understanding of the mind-brain paradox (King, 1996). Quantum chaos has been used as a tool to explain synchronization, in this book, classical synchronization formulations are provided, however, given that in the molecular scale quantum mechanical principles are significantly active, the role of quantum chaos in delivering multi-scale synchronization cannot be ruled out. Especially, since algebraic-geometric tools are extensively used in representing the entanglement and superposition (Bernardi and Carusotto, 2011), a complete analog to this book in terms of pure quantum mechanics is possible to formulate.

Artificial brain is the last machine of mankind: First machine to learn what is nature: We must bypass the era of brain-less bots: The era of conscious machines: Artificial brain would be the last machine of mankind, since willingly or unwillingly the human race wants to reach that point when the machines would take over. If algorithm-based instruction is the key, robots would learn it, outperform humans in every aspect, we have to make a new world of technology where the algorithm does not exist. The era of life-like machines or conscious machines is human destiny now. We live in an exponential information age; everything around us is changing so rapidly that after a few years, a third-year engineering student would have to discard everything he studied in the previous two years, simply because of the fast-technological implementations of an invented technology in the industry.

Number of primes	Human level	Tensor elements	Multinion	Linguistic structure	Hardware	Seed geometry	Operating tensor
4 (2,3,5,7)	Sub-human	8^2	$2 \times 2 \times 2 = \{O\}$	quaternary	Sensor 1		Octonion
5 (+11)	human	12^2	$2 \times 2 \times 3 = \{d\}$	quaternary	Brain 1		Dodecanion
6 (+13)	Sub-human	16^2	$2 \times \{O\}$	quaternary	Sensor 2		hexdecanon
7 (+17)	Human+	18^2	$2 \times 3 \times 3 = \{d\}$	trinary	Brain 2		Octo-deca...
9 (+19, 23)	2xhuman	24^2	$2 \times \{d\}$	quaternary	Brain 3		Qua-di-deca
9	Sub-human	27^2	$3 \times 3 \times 3 = \{O\}$	trinary	Sensor 3		Hep-di-deca
9	Human++	28^2	$2 \times 2 \times 7 = \{d\}$	quaternary	Brain 4		Oct-di-deca
10 (+29)	Alien*	30^2	$2 \times 3 \times 5 = \{t\}$	hexanary	Brain 5		tridecanon
11 (+31)	Sub-human	32^2	$4 \times \{O\}$	quaternary	Sensor 4		Di-tri-deca
12 (+37)	3xhuman	36^2	$3 \times \{d\}$	quaternary	Brain 6		Hex-tri-deca

*Alien refers to $2 \times 3 \times 5$ seed geometric system where elementary tensor is not 2×2 but a pair or triplet of 3×3 or 5×5



Garden of garden → flower → Garden of garden → flower → Garden of garden → flower

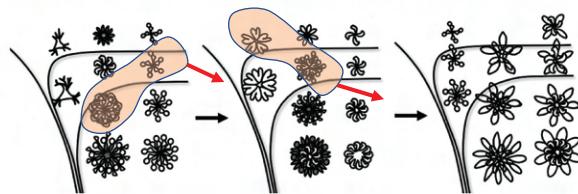


FIGURE 10.12 A table shows how artificial brain's decision-making power could be enhanced beyond humans to the aliens who are not known to mankind. Below, the garden of gardens GOG representation of higher than human's information processing capabilities are shown as ones GOG is others petal of flower.

Now, the problem is that we cannot ignore the elementary interactions as we normally do in the formulations of physics theory, simply because one fundamental element could be me. Therefore, when we try to create an alternative model, we should consider that many-body networks generated at the single element level. We are not far away from a time, when we will not ask the pressure exerted by 1 gm-mole gas, rather we would seek for the information contained in a single gas molecule in that container. It is beyond our brain capacity to process, but we are all pushing human civilization to a point where there will be no turning back, everything around us would estimate and beyond a certain limit that we humans could access using our intelligence, but could feel with our senses.

One option would be to wait, until nature adopts another structural evolution of the entire brain architecture, or holding a micro-brain device on our palm. It will be like we will carry several brains similar to the power of our brain and our brain will work as a manager to these brains, a superior authority which plays only with the output of the inferior brains (Figure 10.12). Nano brain will not be a superior intelligence provider, rather, the last tool of ours to survive in a world where intelligence will be clustered into various pockets whose domains will be decided by something which is not a human, not a machine, not a software, but a virtual life form that is composed of everything we see around us. We will give birth to this unknown creature, who will not have any life form, yet would govern the evolution of every living and non-living things in that world.

While the ever-expanding brain is colliding continuously with the restricted space inside our skull, we are amazed by the synchronous burst of neurons between the two ends of our brains separated by 15 cm. We take shelter into this remarkable phenomenon of simultaneous bursts of neurons because we belong to the class of living species that do not like to walk along with a one-dimensional tape to process information since looking here and it is not allowed there. The question that always troubles us that if we have that creature, will it destroy the mankind, in reply we would argue that we try to preserve baboons and chimps not kill them, so the new creatures will not kill humans, they will feel pity for us. Also do not forget that supremacy does not come alone, severe weaknesses will be there in their hardware too and supreme conscious beings born among the human race have always talked about love not hate. When we try to build artificial brains, we are not attempting to create Frankenstein, we have enough of them among humans already.

The first machine to understand nature as-is: Why we exist? The triangular relationship between the GML, a PPM and a fourth-circuit element (Hinductor, H) change the world-view forever. The century-old faiths that “no question, no answer,” is found to be a wrong question, a reply may come even if no question is asked, fate could be decided even without communication and without measurement. Hardware engineered by the PPM has a guideline for an infinite chain reaction, a drive to match the intricate details of patterns between the two participants that cannot reach an equilibrium ever. The language of bit and the language of the continuum can

coexist as part of GML, wherein the quantum is a local perspective of the global engineering of singularity governed by PPM. Light has a gradient but the darkness is pure; sound has colors, but the silence is pure; a defined state is finite, but a singularity is infinite; a non-prime is rich in factors and decisions, but fixed; in contrast, a prime is neural, pure and a creator of an endless pattern like a life form. The language of Bekenstein number includes a human bias, where the number of bits was everything, the primes exhibiting the knots of darkness is pure, because it sees nothing but symmetry, thus, a few, say 12–14 primes only use 12–14 ways of ordering the geometric shapes to link 99.99% events, structures, that has happened, that are happening and what would happen in the future. We exist because of primes. Thus, we grasp the central idea of it all as so simple, so beautiful, so compelling that we could say to each other, “Oh, how -could it have been otherwise! How could we all have been so blind so long!” Let humanity begin its journey to learn nature as is by harnessing its last machine.

10.13 A CYCLE OF A GARDEN FROM FLOWER TO A PETAL

Without mentioning the case of meander flower garden we could not finish the discussion on the higher than human consciousness. Humans follow the garden of garden of meander flowers as described in [Chapters 2, 6, and 7](#). When universe would create a catalog of conscious machines then it would take a set of petals from multiple garden of gardens and build another garden of meander flowers. Therefore, the table is shown in [Figure 10.12](#) where using simply the mathematical argument we extrapolated the human consciousness to an infinite journey, the same journey could be viewed in terms of meander flower gardens.

When every part of a system grows simultaneously, spontaneously: Imagine we have an architecture of self-assembled time crystals and every part of it is growing, or imagine our whole body, every part of it is growing simultaneously, spontaneously. Conventional science teaches us that there should be a boundary point and beyond that everything would remain static, and then only we would analyze the dynamics happening inside. Here, we have a universal guideline, we create a guideline for how symmetries could change spontaneously. We know how symmetries would break and adopt a new symmetry point. Learning to live with everything that is changing continuously is the new kind of science and we are looking into one such new kinds of practices, engineering of singularity, adventuring confusion, being random and logically circular, doing nonsense. It is a totally new experience, a journey where time and space evolutions would appear messy, random, unpredictable because everything talking to everything has global symmetries, we may look into that. In this world of science, even topology would not take us far, we need a new kind of drawing, the mathematics of patterns. Equations won't help, the interactions of the imaginary worlds would be the mother of all algebras. In this new type of mathematics, we only draw things and the rest of the solutions are automatically derived, we envision a kid of 21st century drawing only circles to solve problems which super-supercomputers cannot fathom. By drawing circles and circles alone, infinity is explored, it is a world of undefined and feedback from infinity. That infinity is the universe itself, it is the complete time crystal, somewhere in a singularity point our times crystals are vibrating and discussing about conscious machines.

The total number of minds in the universe is one. In fact, consciousness is a singularity phasing within all beings.

E. Schrödinger