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"Human knowledge is not endless, but it ends with the Truth…"
Francis Bacon

Evolutionary fractals are defined as fractals structures evolving from previous states into subsequent other different ones, concomitantly with the change of the fractal rule. Decryption of the evolutionary fractals would be and could be very important to decode the way in which most of the scientific new discoveries take place, many times randomly, by accidents or by trial and error, and would also enable to understand evolution not only in Nature but also in science and knowledge, and moreover could be used to generate artificial intelligence models which are mostly non-deterministic, but which actually follow the patterns of the most significant discoveries in science. Expanding on the ideas presented in [1], the author links a possible intelligence model with the CSN Matrix, introduced and presented in this referenced paper. This new intelligence model has the capacity to generate a special type of procedural randomness based on the CSN Matrix, and it is not only able to search and decrypt evolutionary fractals in Nature but is also able to simulate and imitate more appropriately the intelligence processes involved in much of the scientific discoveries, which are actually taking place, often times and very much in non-deterministic ways, by accidents or by trial and error processes.

Keywords: *A.I., evolutionary fractal, CSN Matrix, randomness, trial and error, procedural randomness*

Introduction

The idea that the intelligence processes may be embedded in fractal rules has already been stated by author, since 2016, as in [2].

The paper in this Conference is expanding on the previous paper [1] of the author, by providing an alternative intelligence model to complete the present models of A.I. This new intelligence model is based on the CSN Matrix, as it is presented in the referenced paper [1].

Evolutionary fractals are defined as fractals structures evolving from previous states into subsequent other different ones, concomitantly with the change of the fractal rule.

Decryption of evolutionary fractals in Nature may not only hold the key of understanding Nature and its evolution processes but could also be the key of understanding of human brain functioning and of human intelligence.

The first step, however, is the decryption of evolutionary fractals related to more simple lifeforms, and only then, after the decryption at this first step, the decryption of the human intelligence may be addressed.

CSN Matrix can be used for both, on one hand, to decrypt evolutionary fractals having unknown rules, and on the other, it can be used to simulate the way in which random creative processes occur.

By generating procedural randomness, the CSN Matrix simulates much better how brain behaves, because when making scientific discoveries, often times, existing information is not purely procedurally processed as in classical A.I models, which are mostly deterministic, but often it is processed aleatory by brain, in random processes, as it is in the intelligence model based on the CSN Matrix, presented in this paper.

Hence, the CSN Matrix and the model presented in this paper, can be used to either to generate an algorithm to decrypt evolutionary fractals encountered in Nature, but it can also be used to generate an intelligence model which is closer to the actual way in which scientific discoveries are made and much closer to the way in which new science is generated, simulates better human intelligence random creative processes, and moreover, it also can be used to create enhanced intelligence models.

Literature Review

A.I. History

As presented in [4], [5] and [6], starting with the 1950's, once with the introduction and use of computers, great hopes were related with the A.I. based on the perceptron's model, but unfortunately these expectations, remained for a long period in vain and insufficient results as well as insufficient computing power of the devices of the respective period made these former advances in A.I to halt.

In present, due to high computational power, but also due to the huge amounts of data, permanently collected already from the beginnings of internet,

also known as big data, these former expectations and hopes, abandoned for a while, are back again, mainly based only on these two technical and technological advances.

Time will tell if these technological advances above, along with the path A.I. nowadays has, will be sufficient to create the real, so praised A.I. or this so called A.I. will only improve the tools of mankind to surveil and watch people, in the way of the Orwellian big brother, but also with some undeniable benefits for man, however, never being or becoming a real intelligence, but merely only just another human tool.

Fact is that the perceptron's model, dating back in the '50s of the 20th century, although a rather good model to be used for A.I., has remained very much the same from its introduction, long time ago, and it is still deemed further on, as a standard model for the functioning of an artificial neural network which somehow primitively simulates the neural activity of the human brain.

As it already happened many times in science previously, humans are often inclined to cling desperately to past knowledge and past discoveries in science, and also often times they are deliberately choose not to update obsolete and outdated scientific models.

It seems that mankind has set the bar too high when calling this new tool of it „intelligence", because although man has not yet discovered and understood until now much simpler rules and processes of Nature than the processes in the human brain, he arrogantly wants to imitate the presumably most brilliant creation on Earth, which is the human brain.

How intelligent the present A.I. really is? Present day stage of A.I.

A.I however, is today only able to reproduce information stored, from enormous amounts of information it has access to, or to make pattern recognitions based on its high computational power, big data information and certain specific computer algorithms and subroutines, as in [7], [8] and [9].

At its present stage, A.I. is at most only a developed tool with a limited set of functions and a better name for it would be: "fake intelligence".

This present A.I is a bunch of huge amounts of data combined with a very high computational power, governed by a few computer subroutines trying to make use of this data. It is like a very performant computer with an extremely high memory storage capacity which tries to make use of that data by means of few computer programs which are not really up to this task.

Putting it in terms of biology, it is like an enormous brain, with a huge memory, full of all sort of information, both useful and not useful information, which can calculate almost instantaneously pretty much anything, but a brain which is however lacking the most important thing for a brain in order to be performant, namely, real thinking mechanisms.

In the case of A.I., the carriage has been put before the horses, meaning that intelligence is claimed, neither knowing the fundamentals of functioning of human brain, nor understanding the evolutionary process of human brain

evolution and not even understanding at least the intelligence of the most primitive life forms.

Firstly, the aforementioned evolutionary fractals should be decoded, if possible, and only then, man should try to generate an A.I., created by himself, capable to compete with the Intelligence of Nature.

It is not so much intelligence in imitating human speech or image to create avatars to fake persons and to deceive others. A.I. should not be the intelligence of a thief or of a chameleon. This kind of intelligence is only miming intelligence, not actually being intelligence.

In the light of all this, what we now designate as A.I. may actually be only nothing more than a primitive and an underdeveloped tool, pretentiously and arrogantly named „intelligence".

Taking into account its present limitations, A.I. is, at present, not very much different from a highly complicated computing language, still with many errors to be debugged, and it seems that its best and main advantage is only that it has access to large amounts of information and also to have high computing power and speed.

However, a permanent degradation of human intelligence will have as a result a real danger represented by this fake intelligence which will most likely fool many, in the moment the human intelligence will degrade sufficiently enough.

The dangers when using A.I. instruments such as Chat GPT, are very much the same like the dangers of using internet by someone not being able to verify the information found, and much higher for those persons having an inferior intelligence level.

A.I., as we know it so far, can be used, in the present mainly for classification purposes when dealing with big data information, or more generally, for pattern recognition when dealing with different structures, such as data, shapes, or speech patterns.

Present day A.I. instruments such as Chat GPT are mainly and merely based on pattern recognition in thought and speech and they only fill in gaps and outputs with available information existing in internet, without actually generating new knowledge or information in the sense of novelty or brilliance. A.I. thus learns only by feeding itself with existing information or to put it more exactly, by stealing the respective information from internet.

In terms of efficiency, if we are to compare the human brain with A.I., A.I. uses huge amounts of data and powerful mining algorithms to mine this big data, while human brain is getting along with much less information and much lower calculating power.

Intelligence was and is always about solving problems in the most efficient ways, by employing rapidly and creatively solutions, using data, energy and computing power, as few as possible.

A.I. theory, seriously oversimplifies complicated processes in the human brain, by reducing them to calculus and to analysis of huge amounts of data based on few computer subroutines designated to find patterns, classifications, etc. in that data.

The aim of this paper is to complete the present A.I. models with an element of procedural randomness, of paramount significance in major scientific breakthroughs and discoveries.

Deciphering secrets of Nature, however, could be ultimately, a matter of faith. The scientists and scholars of the Middle Age truly believed in the existence of Nature's secrets, embedded in its structure, and they attempted, with their own very limitated means, to unveil those secrets.

Nowadays, we have sufficient knowledge and enough computing power to try to achieve this goal set by scientists in the Middle Age and to complete their endeavors.

Even though, such as it is now, present stage of A.I., merely just a bunch of mathematical methods, computer algorithms, pretty much unsuccessful when trying to imitate the human intelligence and mainly based on a rather poor and limited mathematical models, such as the model of perceptron, a set of few different activation functions such as: sigmoid, hyperbolic tangent (tanh), rectified linear unit (RELU), arctangent (atan), hard threshold, etc, at its present level could be, however, a useful start tool to be completed with real intelligence models.

In its present stage of A.I., the lack of intelligence of "intelligent" machines is simply just replaced by their amazing gigantic computing power and by their huge memory storage capacities.

Although computing skills are traditionally considered by psychology to make up human intelligence, they only are just a simple component of human intelligence, and they cannot, by no means, replace the full scale of human intelligence, which is by far much more complicated than any human invention so far.

One can easily see, in the all life around us, that almost any living creature is by far more intelligent than any human invention ever made.

As a corollary of this idea above, man should firstly try to replicate such intelligent creation of Nature, e.g. like a simple fly, and only than to have the audacity and the arrogance to simulate the human intelligence processes. Also, there is not much intelligence in face or pattern recognition, because they are also only based on some classical computing mathematical algorithms and on large amounts of data.

Although not particularly intelligent, the present A.I. has especially one huge advantage over any human being. Due to its huge computing power, A.I. can try and fail infinitely in the shortest period of time, much more often than any human.

That is why A.I. should be employed as a main tool for the method proposed by the author. Hence, it could search and identify certain fractal rules by trying out immense amounts of data, with a view to find essential laws and rules definitory for the intelligence encountered in Nature.

Intelligence is much more than mining big data with huge computing power, and it is more than algorithms and optimizations. It is like is has been already said, more about being creative and innovative by finding new different

solutions to complex problems, solutions which cannot be transformed into algorithms.

The issue of a potential “intelligence” of A.I. has been extensively addressed by the author in [11] and one can certainly say that intelligence is much less about memorizing or computing with high speed, but it is more about finding solutions by means of creatively and successfully combining existent experience and past knowledge.

The reason for both, enthusiasm and fear over the evolution of A.I. are caused because A.I. and human brain are mostly compared only in terms of structure, storage capacity and computing power, and it is implicitly assumed by some computer scientists that at the moment when they will have both these same characteristics, A.I. may then have to have the same abilities and feature of the human brain, meaning also empathy, feelings a.s.o.

But as it already stated in the same [11], the human mind is more than about storage capacity and computing power, because not the memory or the computing power make up the ingredients for brilliance, but actually the human mind which is the equivalent of the computer software.

So, human mind being the equivalent of the software of A.I. in computer terms, it is no guarantee that same level of memory and computing power will also ensure the same results and performances with a much weaker “mind” of the A.I., a “mind” which is only another human creation.

Reverting to the problematic of intelligence in Nature and its relationship with evolutionary fractals, one of the thinkers in Ancientry, at the beginnings of the Greek logic, Pythagoras, considered that “the true reality and the explicative element of the world is to be found in numbers and in their proportions”.

The very same idea is expressed by Aristotle when saying that the followers of Pythagoras, dealing with mathematics, considered that the principles of mathematics are the principles of all there is”.

This the moment in the Greek thinking, when man starts to conceive abstract numerical relationships, relationships which make the world and nature intelligible for man, as in [10].

The thinkers of the Middle Age, had later, also the strong belief about the existence of a Golden Number or Ratio, also named God’s Number, which could explain the entire existence.

The intuition of a rule embedded in Nature was, by no means, unfamiliar to early scientists in the Middle Age, and their searched for a Golden Number or God’s Number, which could have been made God’s Creation intelligible for man and would have thus explained the human intelligence and its evolutionary process, as well.

This fact is also related with the ideas presented by author in another paper of him [3], and also relates to the idea that intelligence itself, intelligence which could be finally fully understood by decrypting its codes embedded in Nature.

Although it may seem farfetched to base modern ideas on ideas expressed by the ancient thinkers, it is very well known that in human history, peaks of human knowledge in science and technology, have been reached by certain former scientists in the ancientry. This highly valuable human knowledge,

however, has also, often times vanished once with the death of such outstanding scientists and thinkers.

It is also known and recognized that both, scientific and artistic levels reached by humankind in the ancient era were seen as ideals of man in the Middle Age. Few hundred years thereafter, in the Middle Age, these ideals were almost impossible to be replicated at the high level reached in the ancient times.

Reverting to the level of development in present A.I. models, one can actually see how smart, advanced and evolved the present A.I. is, in the instruments it has generated so far, such as Chat GPT, as in [9], self-driving autonomous cars or robots being able to communicate.

These alleged performances can be seen in the fact that this intelligence is often puzzled by an unexpected question or issue. It can merely only reproduce what he has "memorized in its chips".

A.I. has not even close the ability to find or create new original solutions but can merely only reproduce huge sets of data related to a topic. This data which A.I. has been fed with, is the data available in internet. A.I.'s main advantage is to search rapidly the information available in internet to produce an outcome or a solution, previously delivered in internet, by a certain person to a certain problem, very much in the same way in which a pupil cheats and steal information, during class, from the paper of his neighbor colleague.

Methodology

The Research Question

1. Evolutionary fractals are defined as fractals evolving from a certain shape into another one, by modifying their shapes because of moving through different fractal rules, or in a particular case, from a life form into another, from an initial state of the life form into a final state of life, by passing through a multitude of phases and transformations.
2. More exactly and more technically defined, it means a structure based on and constructed using a set of many fractals, each one having its own fractal rule.
3. Evolutionary fractals may be also deemed as structures in which is embedded the Intelligence of Nature.
4. The first step toward decrypting the Intelligence of Nature is to decode these evolutionary fractals, because decryption of simpler evolutionary fractals encountered in Nature may help to understand highly complicated human brain processes.
5. This is why the understanding of the complicated human brain it is conditioned by decryption of the evolutionary fractals.

If proper analyzed present A.I. is far away to imitate or to emulate even the most primitive forms of life, not to mention human intelligence.

Nature's intelligence, which is extraordinary and not surprisingly far more advanced than A.I., could be simulated by fractals, which could be the most appropriate structure to understand Nature and its intelligence.

Evolutionary fractals, as defined in this paper, may have the potential to extend and to enhance our knowledge and understanding about Nature and its intelligence.

In present, man is hardly trying to imitate something he barely understands, based on an incomplete theory and on a model which has almost 80 years of age. Still, in the meantime, man successfully completed this model with huge amounts of big data and seriously increased the computational power of his machines and devices.

Anyhow, the power of the present A.I., should neither be overestimated, nor underestimated, but its present form is merely that of an additional tool or instrument which could be used much more usefully, if properly employed to find and seek solutions to mankind's problems using the huge amounts of data produced by man himself, in time, instead to be regarded as an intelligence.

Unfortunately, this huge computing power existing today is employed in a rather primitive manner, in the sense that computers are only being used to work as hard as they can, in the way of mining and computing huge amounts of data to extract data or to mine crypto currencies, instead of being also used to decode secrets of Nature in order to understand it.

It can be said the A.I. is nowadays more about the muscles than about the brain, since is working hard without an intelligent plan and without thinking, since neither evolution, nor intelligence of Nature is known to man.

In that sense, as already said, A.I. could also be used merely just as an instrument to help to „read" and to „understand" the real intelligence of Nature by properly setting it to search, identify and decrypt evolutionary fractals. Only then, could be employed to simulate and imitate the Nature's intelligence, and hence be named Intelligence.

Objective

The main assumption used in this paper is that the intelligence of Nature is embedded in fractals and in fractal rules and patterns which one encounters everywhere around.

Now, after more than seven centuries since the occurrence of the idea of a secret rule or code embedded in the structure of Nature, it may be time to revisit this old idea and to address it with the new powerful available means, instruments, but also with the huge computing power from today.

The objective is to generate a model using the theory introduced in this paper, based on the CSN Matrix, which will be employed to detect and decrypt evolutionary fractal rules encountered in Nature, which are actually fractal rules of Nature's intelligence.

The complete and complex nature and intelligence of Nature can neither be imitated nor simulated by a few simple mathematical models which mainly attempt to approximate only what man has understood about Nature's intelligence so far.

Man should also question if A.I. in its actual form and structure could ever have the potential to deliver what is expected from it.

Reverting to the issue of human intelligence and of imitating it, it is well known that many breakthroughs in science and technology have been made not by using algorithms and optimizations, but rather by experiment, trial and error and often times by mere chance.

Hence, the way of science and intelligence is very often not the way of algorithms and optimizations, but it is more often the way of randomness and chance. That is why the present computing power should nowadays be used to seek and find "chances", rather than be used to apply algorithms and optimizations, which are actually the least innovative tools of information technology.

The discovery of a true A.I. based on the intelligence of Nature, could be a matter of faith, and then this intelligence, much more valuable than the present A.I. should be perhaps named N.I. meaning Natural Intelligence, since it will mirror the intelligence of Nature.

Data used for the Intelligence Model based on the CSN Matrix

The data used for the proposed intelligence model are actually the functions which populate the cells of the CSN Matrix in the intelligence model presented below.

These functions which are filled in the cells of the CSN Matrix, could be either randomly selected, or they can be intuited depending on the purpose of the respective intelligence model.

One can also get a grasp of these functions by knowing and analyzing their response and feedback to different inputs.

In the same way in which there is a set of certain activation function which are used to trigger reaction in the perceptron's model corresponding to the neural networks, there can also be identified such sets of functions in the cells of the CSN Matrix which can serve better the purpose of the presented intelligence model.

The oversimplified particular intelligence model example presented in this paper is based on a (4x4) CSN Matrix which is presented in the paper below and is using a set of completely arbitrary functions in order to demonstrate de application of the proposed intelligence model, for a simplified particular case.

The Intelligence Model generating procedural randomness, based on the CSN Matrix

An intelligence model which could be used to approach and to decrypt evolutionary fractals in Nature would be to consider, instead of the Golden Number which was very fashionable some centuries ago, a much more complicated function or relationship to explain nature.

This more elaborate function or transformation could then be able to explain nature based on the result from this single function composite with itself, n times.

If such a function could be identified, then any possible result found in Nature would have the expression:

$$O = ToTo \dots oT * I = T^n * I \quad (1)$$

Where T is the respective transformation applied to the input I and the result of this n times composition is O.

Another possible model and approach to explain Nature, closer to the idea presented of evolutionary fractal, would be to use instead of the same transformation T, a set of n different transformations T_1, T_2, T_3, …, T_n, and the result would be in this case one composition, out of all possible compositions to be made within this chosen set of transformations.

The output in this case has then the form:

$$O = T_1 oT_2 o \dots oT_n * I \quad (2)$$

In order to procedurally address the intelligence model, by keeping a certain set of functions to be permanently considered in an algorithm, one can now use the concept of CSN Matrix, such as previously defined in [1].

The CSN Matrix is an important tool to generate procedural randomness and partly procedural/ partly random intelligence models, able to understand and decrypt evolutionary fractals encountered in Nature.

The CSN Matrix is used in this paper with the purpose to generate the proposed intelligence model, in the following way:

Let us consider:

1) a set of n times differentiable functions with (a) elements, which could be, for example, (a) different n grade or higher polynomial functions, or (a) exponential or logarithmic functions;
2) a set of n times integrable functions with (b) elements, which could be, for example, (b) different grade or polynomial functions, or (b) exponential or logarithmic functions;
3) a number of (c) sets of inversible functions to be used for compositions;
4) a number of (d) mixed sets of functions generated according to the above rules.

The CSN Matrix is defined as follows: it is a matrix whose line cells contain compositions of certain functions or differentials or integrals of certain functions, as it will be shown and explained shortly.

This CSN Matrix has a number of n columns and a number of lines equal to the number m, as explained below, and it is the main tool the intelligence model generated in this paper.

Let us consider a chosen number n, a large number corresponding to the compositions, differentials or integrals performed on the functions in the cells of the CSN Matrix, which is also the number of columns of this communication matrix. Let us consider the number m calculated from a, b, c, d above as: m = a

+ b + c + d, a large number corresponding to the number of rows of the communication functions matrix.

Then the first (a) lines in the CSN Matrix are generated by successive differentiation of a number of (a) n times differentiable functions, such as considered above. The elements of line j in the CSN Matrix ($1 \leq j \leq a$) will then be generated in the following way:

$$T_{j,i+1}(x) = T_{j,i}'(x) \quad (3)$$

The next (b) lines in the CSN Matrix are generated by successive integration of a (b) n times integrable functions, such as considered above. The elements of line j in the CSN Matrix ($a < j \leq a+b$) will then be generated in the following way:

$$T_{j,i+1} = \int T_{ji}(x)dx \quad (4)$$

The next (c) lines in the CSN Matrix are generated by successive composition of a (c) inversable functions, such as considered above. The elements of line j in the CSN Matrix ($a+b < j \leq a+b+c$) will then be generated in the following way:

$$T_{j,i+1} = T_{i+1}(T_{j,i}(x)) \quad (5)$$

The next (d) lines in the CSN Matrix are generated by successively mixing the rules presented, such as considered above. The elements of line j in the CSN Matrix ($a+b+c < j \leq m$) will then be generated by mixing those above rules (3), (4) and (5) for generating elements in the CSN Matrix.

Let us now consider an intelligence model based on the CSN Matrix constructed in the following way:

1) Randomly generate input values for x to be used in this presented model
2) Choose the corresponding transformation or key $T_{j,i}$, depending on the interval to which the random x value pertains
3) Calculate the corresponding output.

According to this encryption key used, based on the input and the encryption key used, the encoded value of output may be calculated using a computer subroutine, such as presented in a particular case in the section below. A performing algorithm could check CSN Matrices of very large (m x n) dimensions, using successively various different cell functions elements, in order to detect and assess compatibility with, for example, evolutionary fractal shapes and structures according to the theory presented in this paper.

The total number of possibilities resulted from all permutations of the cells in the CSN Matrix is $(n!)^{m!}$, and hence, the probability of occurrence of a certain (m x n) CSN Matrix is thus of $1/[(n!)^{m!}]$.

What is really important in the intelligence model presented in this paper is the process of obtaining procedural randomness and thus, the element of randomness characterizes both: the input value x, and the corresponding output value by applying the CSN Matrix, as well. This element of randomness is important for at least two different main reasons: on one hand, for those non-believers, which are still however believing in hazard, randomness and accident, and on the other hand for those believing in the Intelligent Creation or in the Intelligent Plan or the Intelligent Design of the Creator.

Both of these groups of people above know that often times, one can discover the solution to a problem not because one is intelligent or hardworking, but simply just by sheer luck. In the very same way, if man is to be lucky enough, and with the help of his hardworking computers, he might have a chance to discover the secret of a real intelligence and then to use and to apply this secret.

A Particular Case of the Intelligence Model presented in this paper

Let us now consider a particular case of the intelligence model presented, by using some specific chosen functions in the cells of the CSN Matrix, a random value x and the corresponding key or transformation to generate the output of the CSN Matrix. For this particular case, a (4 x 4) CSN Matrix with the cell functions and the differential and integral transformations bellow, and with an encryption key which assigns a certain transformation depending on the value of the random input x considered:

Let us consider the following 4 function elements:

$$T_1 = 4x^4 + 3x^3 + 2x^2 + x \quad (6)$$

which is a polynomial function, which is also 4 times differentiable;

$$T_2 = 10^x \quad (7)$$

which is an exponential function, which is also n times differentiable but also n times integrable;

$$T_3 = x + 1 \quad (8)$$

which is a polynomial function, which is also n times integrable;

Using these chosen functions above, based on them, one can generate the elements of the first line in the CSN Matrix such as follows:

$$T_{11}(x) = T_1(x),\ T_{12}(x) = T_{11}(T_2(x),\ T_{13}(x) = T_{12}\big(T_3(x)\big),\ T_{14}(x) = T_{13}(T_4(x)) \quad (9)$$

The elements in the second line of CSN Matrix will be generated by successively differentiating the function $T_1(x)$, such as follows:

$$T_{21}(x) = T_1(x),\ T_{22}(x) = T_1'(x),\ T_{23} = T_1''(x),\ T_{24}(x) = T_1'''(x)) \quad (10)$$

The elements in the third line of CSN Matrix will be generated by successively integrating the function $T_3(x)$, such as follows:

$$T_{31}(x) = T_3(x),\ T_{32}(x) = \int T_{31}(x)dx,\ T_{33}(x) = \int T_{32}(x)dx,\ T_{34}(x) = \int T_{33}(x)dx \quad (11)$$

The elements in the fourth line of CSN Matrix will be generated by mixing the rules used in the generation of the elements of the first three lines, for example, such as follows:

$$T_{41}(x) = T_4(x),\ T_{42}(x) = \int T_{41}(x)dx,\ T_{43}(x) = T_1\big(T_{42}(x)\big),\ T_{44}(x) = T_{43}'(x) \quad (12)$$

One can choose a certain (4 x 4) CSN Matrix, out of the total number of $(4!)^{4!}$ possible matrices having the same function elements, a random input value x and its corresponding key or transformation and then depending on these, an output is generated for the randomly chosen input value x.

The motivation for choosing a random input number x in generating the output, has been already stated and explained in the previous subsection.

The actual implementation of this particular model used for exemplification purposes is presented in the next section.

The Computer Algorithm corresponding to the Intelligence Model

N is the number of intervals considered in the algorithm, in accordance with the dimensions of the CSN Matrix (in our particular case: N=16)

Using the Matlab function rand() and the formula in Matlab: x = a + (b-a)*rand(N,1), there can be generated, each time, N different random numbers x, each of them in the each subinterval considered for the CSN Matrix.

In our particular case, the entire interval of definition for x is (a, b) = (0, 1600)

By applying the above rand() function and the above formula in the Matlab algorithm, at each step, there are generated 16 different numbers, each of them placed each subinterval considered: (a, b) = (0, 1600)

An additional Matlab function is to be further on used, to complete the algorithm if it is to choose one random value of x, out of the 16 randomly generated input numbers

The Matlab subroutine generated with the previous CSN Matrix is the following:

```
function [ret] = T1()
syms x;
ret = 4*x^4 + 3*x^3 +
2*x^2 + x;
end

function [ret] = T2()
syms x;
ret = 2^x;
end

function [ret] = T3()
syms x;
ret = x + 1;
end

function [ret] = T1()
syms x;
ret = log10(x);
end

function [ret] = T21()
syms x;
ret = x + 1;
end

function [ret] = T22()
syms x;
ret = int(T21, x);
end

function [ret] = T23()
syms x;
ret = int(T22, x);
end

function [ret] = T24()
syms x;
ret = int(T23, x);
end

function [ret] = T31()
syms x;
```

```
function [ret] = T11()
syms x;
ret = T1;
end

function [ret] = T12()
syms x;
ret = compose(T1, T2);
end

function [ret] = T13()
syms x;
ret = compose(T12, T3);
end

function [ret] = T14()
syms x;
ret = compose(T13, T4);
end

function Tkey
syms x;

x = input('Enter x:');

if ((x>=0)&&(x<=100))
Tkey = matlabFunction(T11);
disp(Tkey(x));

elseif ((x>100)&&(x<=200))
Tkey = matlabFunction(T12);
disp(Tkey(x));

elseif ((x>200)&&(x<=300))
Tkey = matlabFunction(T13);
disp(Tkey(x));



elseif ((x>300)&&(x<=400))
Tkey = matlabFunction(T14);
disp(Tkey(x));

elseif ((x>400)&&(x<=500))
Tkey = matlabFunction(T21);
disp(Tkey(x));
```

```
ret = 4*x^4 + 3*x^3 +
2*x^2 + x;
end

function [ret] = T32()
syms x;
ret = diff(T31, x);
end

function [ret] = T33()
syms x;
ret = diff(T32, x);
end

function [ret] = T34()
syms x;
ret = diff(T33, x);
end

function [ret] = T41()
syms x;
ret = log10(x);
end

function [ret] = T42()
syms x;
ret = int(T41, x);
end

function [ret] = T43()
syms x;
ret    =    compose(T1,
T42);
end

function [ret] = T44
syms x;
ret = diff(T43, x);
end
```

```
elseif ((x>500)&&(x<=600))
Tkey = matlabFunction(T22);
disp(Tkey(x));

elseif ((x>600)&&(x<=700))
Tkey = matlabFunction(T23);
disp(Tkey(x));

elseif ((x>700)&&(x<=800))
Tkey = matlabFunction(T24);
disp(Tkey(x));

elseif ((x>800)&&(x<=900))
Tkey = matlabFunction(T31);
disp(Tkey(x));

elseif ((x>900)&&(x<=1000))
Tkey = matlabFunction(T32);
disp(Tkey(x));

elseif
((x>1000)&&(x<=1100))
Tkey = matlabFunction(T33);
disp(Tkey(x));

elseif
((x>1100)&&(x<=1200))
Tkey = matlabFunction(T34);
disp(Tkey(x));


elseif
((x>1200)&&(x<=1300))
Tkey = matlabFunction(T41);
disp(Tkey(x));

elseif
((x>1300)&&(x<=1400))
Tkey = matlabFunction(T42);
disp(Tkey(x));

elseif
((x>1400)&&(x<=1500))
Tkey = matlabFunction(T43);
disp(Tkey(x));
```

```
elseif
((x>1500)&&(x<=1600))
Tkey = matlabFunction(T44);
disp(Tkey(x));

else
disp('Error, choose Key
between 0 and 1600!');
end

end
```

Results

Depending on both, the functions chosen in the cells of the CSN Matrix and the input value x, the corresponding outputs using the presented model and algorithm can be adapted to very small scale either by using infinitesimal small input numbers as x random input values, or by calculating the inverse of the value T of the output, (1/T) or by using other functions.

Normal scale intelligence models which regarding Nature observable with the naked eye, could be obtained in the presented algorithm, by using, for example, random x input numbers between 1 and 16 instead of numbers between 0 and 1600, or by using other functions.

Large scale phenomena (cosmology) could be implemented by using x numbers between 0 and 1600, producing very large outputs, as it has been implemented in the particular case of the algorithm presented or by using other functions which have very large numbers as outputs.

Taking into account these results above, this intelligence model proposed, could be used for decryptions of Nature ranging from the small scale up to the very large scale.

The main objective of this paper was to create an instrument to decrypt evolutionary fractals in Nature, and this is also the main result of this paper, namely to generate an intelligence model to decrypt evolutionary fractals.

The presented particular intelligence model proposed along with its corresponding algorithms may be deemed as other significant results of this paper.

Nevertheless, concrete numerical results to be obtained by applying the generated intelligence model based on the CSN Matrix may, however, require specific knowledge, related to the respective concrete evolutionary fractals and the corresponding processes involved in the evolution of the respective analyzed lifeforms and also knowledge about specific functions to be placed in the cells of the CSN Matrix, and this is not an object of this paper.

Moreover, concrete numerical results to be obtained by employing the proposed intelligence model and its corresponding computer algorithm would

require, however, huge computing efforts to cover a great deal of input values and CSN Matrices, exactly as it usually happens in the case of training of an A.I. model or when mining huge amounts of data.
That is why, supposing that the required specific knowledge of the evolutionary fractals would be available, in order to obtain such concrete results by using the model proposed, would be highly costly and could require huge resources, in terms of both, time and money, and neither represented, therefore, an objective of this paper.

Discussion and Further Development and Research

A further development of the ideas presented in this paper would be to create and develop a more complex algorithm based on the model using the CSN Matrix within this paper, which could be used with two different purposes.

On one hand to understand the intelligence of Nature and how life forms evolve from certain previous ones into other ones more evolved, at a subsequent stage in time.

On the other hand, could be useful to generate and develop artificial intelligence models which are actually more closely related to the intelligence processes within the human brain and more appropriate than the mostly deterministic A.I. models which have been already generated so far.

This CSN Algorithm intended to be generated and developed consequently, is an algorithm mainly based on the intelligence model using CSN Matrix introduced in this paper.

Another development intended is the introduction, generation and development of enhanced intelligence models based on the CSN Matrix, which are actually either artificial intelligence models solely based on the CSN Matrix, or enhanced intelligence models which combine the present A.I. models which are mainly deterministic with the intelligence models based on CSN Matrix, thus enabling a better simulation of the real intelligence processes encountered in Nature or in the human brain itself

Conclusions

The present day A.I. is still at an incipient and primitive stage of development. Even though it uses stochasticity in its models, it is well known that once a certain value of probability is assigned to a process, the whole model ceases to be stochastic anymore.

When one looks at the evolution of human knowledge, of human science and how many discoveries took actually place in the history of mankind, one cannot, by no means, neglect or oversee the importance of the random and accidents in the way the science evolves.

In the very same way, the evolution of lifeforms from certain ones into other ones, also follow many times processes which are characterized by what is called trial and error.

In order to take into account these facts, a real intelligence model should necessarily take into consideration the important role of randomness and of trial-and-error processes.

This paper takes into account all these facts and introduces an intelligence model which does not disregard the importance of randomness and of trial and error.

It may very well be that a complete intelligence model should have also a greater proportion of determinism than the one in the algorithm proposed using the CSN Matrix, and hence a combined model between the present day A.I. models and the model proposed in this paper may be a good compromising solution.

Decryption of evolutionary fractals may hold the key of understanding not only of Nature in general, but also of the human brain functioning and of the human intelligence.

The first step in understanding both, Nature and Intelligence, is the decryption of evolutionary fractals related to simplest lifeforms, and only then, after the decryption at this first step takes place, the decryption of the human intelligence may be finally addressed.

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