U-MENTALISMUTILITY PATENT: AN OVERVIEW

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ABSTRACT

This paper discloses in synthesis a super-computation computer architecture (CA) model, presently a provisional Patent Application at INPI (nº 116408). The outline is focused on a method to perform computation at or near the speed of light, resorting to an inversion of the Princeton CA. It expands from isomorphic binary/RGB (typical) digital "images", in a network of (UTM)s over Turing-machines (M)s. From the binary/RGB code, an arithmetic theory of (typical) digital images permits fully synchronous/orthogonal calculus in parallelism, wherefrom an exponential surplus is achieved. One such architecture depends on any "cell"-like exponential-prone basis such as the "pixel", or rather the RGB "octet-byte", limited as it may be, once it is congruent with any wave-particle duality principle in observable objects under the electromagnetic spectrum and reprogrammable designed. Well-ordered instructions in binary/RGB modules are, further, programming composed to alter the structure of the Internet, in virtual/virtuous eternal recursion/recurrence, under man-machine/machine-machine communication ontology.

KEYWORDS

U-Mentalism, Super-computation, Computer Architecture, Cybernetics, Programming Languages Design.

1. INTRODUCTION

This document is intended to serve as white paper to describe in the most possible composed details and in anticipation the technology of U-Mentalism. As referred beforehand "U-Mentalism is a philosophical and programming idea that proposes a singular (one only and *individual*, *intensional*) and universal (all and wholly *comprehensive*, *extensional*) programming language which is, simultaneously, an inverted scheme of all the established computer architectures (…)"[1], with this meaning a common ever-evolving Assembly Programming Language, giving rise to a semantic explosion of programming languages, all throughout what can be described as an inversion of the so called von Neumann or Princeton CA in network cybernetic fashion. Protected as it may be by a provisional Patent Application at INPI (Portuguese Institute of Industrial Property) (nº 116408), a fairly elaborated disclosure can be eloquent enough as to describe its most basic settings. Although fundamentally expanded in technical computational terms, it should always be attained that one such implementational, informatic and informational method [U-Mentalism and the "C" approach in computation] is inextricable from a metaphysical naturalistic method [U-Mentalism and the "O" approach in ontology]. In addition to this, it is also to remember that the shades of relativistic and possibly technical contentious matter are all related to the perdurable problem of the context and contingent matter of technology's state-of-the-art, yet never to the very core of the new utility general-purpose application or, better said, the invention's original idea. Lastly, it is worth mentioning that the technical drawing of the CA herein disposed can also be found in the following divulging website: *www.u-mentalism.com* .

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2.1. The imagetic frame of reference of U-Mentalism in relation to the "O(ntological)" and "C(omputational)" approaches

We shall begin by stating that the "C" method is to be performed by UTM(s) with controlled, orthogonal and synchronous, camera-like digital images RGB sensing/processing and computing binary isomorphic processors, thus with (typical) digital images "scanner" (impression) and "printer" (emission) abilities. Universal Turing Machines are described in .6 "The universal computing machine" of Alan Turing´s 1936 seminal paper *On Computable Numbers, with an Application to the Entscheidungsproblem* [2]. In this paragraph the machine $\mathcal{U}$ is supplied with a tape where is ahead written the S. D. (standard description)for any other machine $\mathcal{M}$. In such manner, $\mathcal{U}$ will compute exactly the same sequence as the machine $\mathcal{M}$. The novelty herein in U-Mentalism is that the U-machine or UTM(s) are camera image sensing (impression) and processing (emission) RGB/binary isomorphic processing computers with likewise symbols and *m*-configurations, and because UTM(s) are also $\mathcal{M}$(s), every UTM is also able to compute any other UTM(s)' computable sequence, and in such a way that any such computable sequence in a network of information, or the Internet, is equally likely to be computed. In UTM(s) the graphical camera display is the forefront processor, and RGB, although synchronous to the binary code, is the primeval symbolic feedback, in exact opposition to classical computation in M(s), wherein control and communication is wholly set on the binary code.

Now, in U-Mentalism under the "O" approach, what is relevant is the constitution of the physicalist most differentiated quanta of spacetime and observables, each of which to bear all possible viewpoint "images" for every possible and most differentiated quanta of spacetime and observables, wherein the latter observables are themselves included, as well as every all other, thus conceivably measured, in every possible viewpoint "images" in spacetime, infinitely and recursively. All in all, one such cogitation is produced by a pure imagetic frame of reference ofspacetime with bijective transformations of the state spacetime common to the different observers, and wherein the proper metric/imagetic/recursive and observable state spacetime is the observational reference frame of spacetime itself. All in all, in an analogy argument it goes as if spacetime, not affected by the indeterminacy principle (Heisenberg) and in full entanglement, could infinitely observe itself with the frame of reference being any constituted chosen metric and noematic image. If, for example, we could, non-contradictorily, in inter-*noumenal* or inter-*monadic* fashion, observe every viewpoint of every photon for the most differentiated quanta of spacetime observables, recursively in a standard description (S.D.) frame of reference of imagetic nature, herein presumed the pure imagetic viewpoint of photons, we are more inclined to understand not only the observables incompleteness (roughly expanding Gödel´s theorems from logic to "O") and undefinability (roughly expanding Tarski´s theorem from logic to "O"), but also, more conveniently, the consistent and effective passible intermediate states if the set of boundaries or limits are much less forceful. One such case is, most definitely, the"(typical) digital image", a conveniently neutral physicalist viewpoint, further permitting the classes of computable expressions and functions, such as the binary code at its core, to be mapped onto images, as expressions of the RGB codomain. We choose the S.D. frame of reference to be, according to the state-of-the-art technology, the 8K (≈8000 Pixels) 60 Frames per Second (FPS), 24 bits in depth images, choosing pixels-per-inch (PPI) as the standard resolution pattern, in which case we are exhibiting a basic setting for U-Mentalism under the "C" approach. In this wise, although far away from the philosophical *crux* of U-Mentalism "O" - "every possible image in every possible spacetime composed in every possible mind and *n*-dimensionally by *perceived* photons of light" [1] -we are resolutely bridging the chiasm by means of the presentation of a simple object, i.e., an $\mathcal{U}$.

2.2. U-Mentalism as a method of (typical) digital images non-standard positional numeration base with isomorphic many-bijective modules recursive powers

Considering the general analogy between the "byte" and the "pixel", with 2^8 (0-255) (256 tonal/chromatic values per each byte in the pixel with 3 pixels), it is known that a single RGB pixel holds, according to the formula $2(^{8x3})$, i.e., 16.777.216 tonal values or colours, which is basically the same number of bytes overall combination. This value corresponds to 2^{24} in prime factorization, which is a measure very appurtenant due to the imperative of cryptography in the system. The provisory value of the pixel (2^{24} colour/bytes combinations) is now our minimal symbolic unit, in correlation with the standard binary code, also an (observable noematic) wavelength impression. Now, the density of the pixel equation in agreement with the number of total pixels provides the image resolution in PPI=$\frac{d_p}{d_i}$[diagonal resolution in pixels=(d_p);diagonal size in inches = (d_i])]after the diagonal pixel resolution found through the use of the Pythagorean theorem:

$$d_p = \sqrt{w_p^2 + h_p^2}$$

[diagonal resolution in pixels =(d_p); width resolution in pixels =(w_p);height resolution in pixels=(h_p)]. Needless to say, we are envisaging any possible variations of measures in the overall structural and functional method.

Also relevant, both physically and symbolically, is the fact that the system in UTM(s) has invariance by synchronicity in all positively-defined and non-accelerating frames of reference (herein "Frames Per Second" = FPS) of the "(typical) digital image" in the system, and likewise the speed of light in the vacuum is the invariant *non plus ultra* limit of the technology. Therefore, under one such assertion, an 8K Ultra Full HD (7680*4320) has 33.177.600 pixels disposed (in a 16:9 ratio, i.e., 2^4: 3^2 in prime factorization). In other terms, this means that each 8K RGB digital colour (FPS) image has 796.262.400 bits, or 99.532.800 bytes.

As we are referring to an RGB/binary synthesis within an isomorphic and bijective model, we are most surely asserting a presumed less-to-the-furthest well-ordering recollection of typical digital images, arriving either by general image sensing or general image processing to the UTM(s), from a pool of very different kinds of typical digital images most generally found on the Internet: photos, URL(s) and Web pages, all Turing-machine Frames (FPS) including e-mails and instant messaging, kernel and system logs, OS environment FPS "films", digital TV FPS "films", and every other sort of Turing-machines graphical interface FPS like outdoors and consoles, ATM(s) and GPS(s), CCTV, camera drones, mobiles and tablets, ubiquitous computing things, etc.

Before anything else, the well-ordering of the RGB/binary graphical/digital coeval isomorphic code should be preliminarily understood. Accordingly, below is shown a table of partial well-ordering (16; 0-15) in a positional numeration base, with inherent many-bijective modules recursive powers. The table is the correspondent to $\frac{256}{16}$ bytes or colours, i.e., $\frac{1}{16}$ of the whole symbolic power of one pixel only under the standard description of the 8K model which holds 33.177.600 pixels. It is to be noticed in the table below that the symbolic manipulation under this pixelized part is, hence, only affecting the Blue Byte (in truth, rounded off to even numbers, roughly only $\frac{7680*3}{16}$ i.e., $\frac{1}{1440}$ bytes parts of the total in one width or horizontal pixelized line with 7680 pixels, in turn intersected with 4320 pixels in height or vertical lines, in a 16:9 ratio, which sums up a total for each FPS, or "(typical) digital image", of≈33.000.000 pixels and, therefore, of ≈99.000.000 bytes.

This is so due to the patterns of the RGB code industry convention, wherein WHITE is 255*65536+255*256+255 = #FFFFFF, and so, by order, RED is 255*65536+0*256+0 = #FF0000, GREEN is 0*65536+255*256+0 = #00FF00, and BLUE is 0*65536+0*256+255 = #0000FF. However, any other suitable well-ordering complies and falls as predicted and logically accommodable in the technology.

Table 1. RGB 24 Bits Colour Calculus, RGB Binary, Hexa, and Ordinal RGB modules

RGB 24 Bits Colour Calculus	**RGB Binary**	**Hexa**	**Ordinal module and Decimal**
(0*65536)+(0*256)+Blue	(00000000,00000000,00000000)	#000000 = 0	1^{st} = 0
(0*65536)+(0*256)+Blue	(00000000,00000000,00000001)	#000001 = 1	$2^{nd,}$ =1
(0*65536)+(0*256)+Blue	(00000000,00000000,00000010)	#000002 = 2	3^{rd} = 2
(0*65536)+(0*256)+Blue	(00000000,00000000,00000011)	#000003 = 3	4^{th} =3
(0*65536)+(0*256)+Blue	(00000000,00000000,00000100)	#000004 = 4	5^{th} = 4
(0*65536)+(0*256)+Blue	(00000000,00000000,00000101)	#000005 = 5	6^{th} = 5
(0*65536)+(0*256)+Blue	(00000000,00000000,00000110)	#000006 = 6	7^{th} = 6
(0*65536)+(0*256)+Blue	(00000000,00000000,00000111)	#000007 = 7	8^{th} = 7
(0*65536)+(0*256)+Blue	(00000000,00000000,00001000)	#000008 = 8	9^{th} =8
(0*65536)+(0*256)+Blue	(00000000,00000000,00001001)	#000009 = 9	10^{th} = 9
(0*65536)+(0*256)+Blue	(00000000,00000000,00001010)	#00000a = 10	11^{th} = 10
(0*65536)+(0*256)+Blue	(00000000,00000000,00001011)	#00000b = 11	12^{th} = 11
(0*65536)+(0*256)+Blue	(00000000,00000000,00001100)	#00000c = 12	13^{th} = 12
(0*65536)+(0*256)+Blue	(00000000,00000000,00001101)	#00000d = 13	14^{th} = 13
(0*65536)+(0*256)+Blue	(00000000,00000000,00001110)	#00000e = 14	15^{th} = 14
(0*65536)+(0*256)+Blue	(00000000,00000000,00001111)	#00000f = 15	16^{th} = 15
(0*65536)+(0*256)+Blue	(00000000,00000000,00010000)	#000010 = 16	17^{th} = 16

The well-ordering herein disposed constitutes itself a major resemblance feature with the fundamental theorem of arithmetic, but this time in graphic/digital format, and fundamentally with inherent many-bijective recursive powers under super-computation, greatly emancipating the products of the faculty of imagination, with much greater power of synthesis and scope. Because it is not only analytical, but dialectic, or better said dynamic, it is not only arithmetic, but essentially algorithmic.

Indeed, the unique-prime factorization theorem in arithmetic progression, as well as any chosen unique or non-unique progression containing composites (not necessarily through 8 bits modules) is *spontaneously* an algorithm of the system, moreover with canonical or non-canonical operations and functions, either cognitive (man-machine noematic-representing) or practical (man-machine evaluation-apt and choice-expressing), where from mathematical and philosophical noemas and judgements are predicated in relation with UTM(s).

In what regards the positional system, enough is said if we declare that the binary radix of the system, congruent with any other numeral system, works with the “octets-bytes”, or rather “3 octets – 3 bytes”, of the “pixel” itself as placed (RGB bytes and colour) value notations, with width and height, and ahead time-valued and inter placed-FPS combined index positions, constituting any possible number or algorithm. Let us notice that by programming itself, non-*autonomously* but *spontaneously*, a non-standard positional numeral system, in synthesis (presumably also under the unity of apperception in man-machine communication) and synchronicity with a place and time combined valued notations, is present, even if the system is a standard positional numeral system.

At this point, with the value at hand of 99.532.800 bytes in an 8K Ultra HD digital image, this value corresponds to the total isomorphic RGB digital image-to-binary code ready to be processed by image sensors (impression), and also ahead processors (emission), being in this way clear that the system has only to differentiate 2^8 per byte/per pixel, or 2^{8*3} per pixel locally, instead of the much harsher demand of the linear-dependent CPU, or non-linear CPU-dependent GPGPU general amount of 99.532.800 bytes per FPS, in one "(typical) digital image".

The next step is, thus, the assessment of the chosen value of 60 FPS (Frames per Second) in conjunction with the present invention, a pretty conservative value to take into account, especially if we consider that the INRS research team has, with the T-CUP, overpassed the threshold of 10 trillion FPS, invading the femtosecond scale, i.e., $\frac{1}{1*10^{-15}}$ of one second (or quadrillionth of a second). Now, 60 (2^2*3*5 in prime factorization) FPS, as soon as it meets the second FPS or frame, is defined as a "movement-image" or "film", pointing out to a value of

60 (FPS) * 60 (´´) * 60(´) * 99.532.800 bytes

21.499.085.000.000 = 2.1499085e+13 bytes per hour in one film only in the technology herein presented. The correspondent and conveniently converted value of bytes per hour in one film only is, hence, 2.1499085e+25 Terabytes, or 21.499085*10^{15}Zettabyes.

It is pertinent to contend that this value is a dense discrete metric measure and, although it can be put forward in synthesis in one film only, in programming algorithmic technical terms it might eventually have been formed by the concurrence of many permuted and/or combined, rather than composed, "films", or as it might be FPS tunnels of "pixels" as wavelength impressions/emissions all throughout every bit and at the full length of the movement-image per hour in one film only under the technology.

Confronting anew with Alan Turing´s *On Computable Numbers, with an Application to the Entscheidungsproblem*, definition – "The machine is supplied with a 'tape' (the analogue of paper) running through it, and divided into sections (called 'squares') each capable of bearing a 'symbol'"[2] – the shift to U-Mentalism in the "C" approach is easy to follow if we declare that the "tape" is now film, "squares" are now (FPS) frames, and the "symbol" the graphical/digital movement-image encompassing the necessary RGB/binary "*r*-th bearing of the symbol" in network distributed in as many as possible partial computing UTM(s).

Attention should also be called to the fact that IDC and Seagate forecast that the global datasphere, which was of 33 Zettabytes in 2018, will grow to 175 Zettabytes ($175 * 10^{21}$ bytes) by the coming year of 2025 [3]. In other words, the figure found of 21.499085*10^{15} Zettabyes for U-Mentalism one hour of one film only of processing power return from data is, on its own, 1.2285191e+14 times more than the expected global data for 2025. In point of fact, it would have to elapse 120 years, with each year equally with 2025's 175 Zettabytes + a 100% growth rate for each year, so that the data sphere would approximate the return result of processing power of the technology for one only film of one hour only thereof encapsulated. The growth rate of data is hereof paramount, as considering if not, figures are that 17.500 years, each with equal 175 Zettabytes of data, would have to pass by to meet one hour only of U-Mentalism, with very conservative parameters for the processing power. In view of this, and on the other way, assuming the quadratic nature of quantum computing worst-case complexity in confront with classical computation, if we envisage the system´s complexity complemented with quantum computing complexity, and most specially, counting with the accelerator factor of U-Mentalism on the production of data, the inception in years might be dramatically shorter. What is more,

supposing that the technology and CA would work on the full 175 Zettabytes of global data for the year 2025, the super-computation involved would assume 48.611.111 Terabytes per second ($4.8611111 * 10^{19}$ bytes per second), which sums up $2^{65.39792}$ per second, already above the capacity of a 64 bits architecture. In truth, in one such case, the technology is imminently conjectured to improve above 1 Exbibyte (EiB) = 2^{60} or 1024^6.

Because the S.D. of the technology can be represented by a set forming the symmetric group of the set, which is a bijection from S.D. to itself, and for which every placed octet-byte (binary) element occurs exactly once as the corresponding placed (RGB) image value, $S.D._n$ is the symmetric group under permutation, a broad relation and it is also a function composition under group theory. For the reason of implementation of less-to-the-furthest well-ordered recollection (large numbers arithmetic) and further forward well-ordered collection (at large algorithmic) of typical digital images, onward to be run by as many as possible UTM(s) in a network of UTM(s) on the Internet, a calculus of permutations is needed and, complementarily, it is imperative to calculate a fair assessment of U-Mentalism computational time complexity. With this procedure we are already asseverating the inclusion of crucial demands of the system, such as the use of AI & cryptography general image processing of typical digital images, apart from general image sensing of typical digital images, as well as the run time complexity in relation with the data memory involved.

3.1. U-Mentalism (typical) digital images permutations in partial and distributed UTM(s) in a network, on the Internet

Once the 8K resolution Ultra Full HD (typical) digital image (FPS) bears $(7680 * 4320)$ pixels, which sums up 33.177.600 pixels (width * height), what follows is the application of the formula of permutation having in mind the measurement in pixels

$$P(n,r)\frac{n!}{(n-r)!}$$

Thus, $n^?$ is, really, the number of colors per pixel, which is 256^3 and the correspondent to the combination range, which equals 16.777.216 color combinations per pixel, while $r^?$ is, really, the previous value of 8K Ultra Full HD (width * height), i.e., 33.177.600 pixels. It is very easy to appreciate that the break-up of the two orders of factorials points out to unmanageable numbers, directing both to countable infinite numbers, and $O(n!)$ non-assessing time complexity, regardless of the CA, recursion power or machine. One such calculus is, nevertheless, judiciously desirable by cause of the intrinsically $O(n!)$ factorial time complexity exposition of the system, dragging $O(2\text{^}n)$ exponential time, and O(n^2) quadratic time hardness lines, as well as, in middle-way and by order, $O(n)$ linear and $O(log\ n)$ logarithmic times -herein $O(n!)$ grows faster as it abridges a constant exponential base 2 -, but on the side of U-Mentalism overlapping solvability, not of classical computation. Simply, the algorithms of U-Mentalism are yet unknown, and the infimum complexity that solves a class of problems is of the same complexity as that of the problem. One such assessment comes even beforehand newly fine-grained analysis, defining the possible class of problems as the set of computational problems of related resource-based complexity, given that time, processing, memory, and more so the relation between them is radically different in U-Mentalism, however included in Turing-machines computability *Application to the Entscheidungsproblem* [2].

On the edge, by nature of the intrinsic arithmetic system in U-Mentalism, we could even consider each frame a large number image, reducing the composites factor in 8K of 33.177.600 pixels to one FPS and, consequently, to each one (FPS) large number linear arithmetic progression image,

which and in turn transforms the calculus of the combination of colors per pixel per FPS, to one onlylarge number arithmetic mirror per FPS. One such FPS large number image progression would meet a factorial (FPS) table itself of $O(n)$ linear time complexity, that is made exactly a "C"*imago mundi* for the "movement-image" recursion in the system. It is true that the immediate next polynomial running times (quadratic, cubic, n^c, etc) hold important classes of algorithms to discern an unequivocal well-ordered (FPS) large numbers arithmetic progression mirrored (RGB) images, in recollection (composition) and collection (permutations/combinations) of typical digital images. However, U-Mentalism is not a system to solve one such linear progression FPS problem, but instead to solve ahead any algorithm class problems newly defined by the system itself, with inherent new space and time complexity powers, insofar one such linear FPS progression is being expanded in the system.

It is important, under this context, to remember that decidability is based on the localistdecidability (even working with non-localist quantum computation by chance) of the pixel isomorphic RGB image of every binary octet. Accordingly, the large number arithmetic (RGB) image mirrors of the system have already exceedingly computing power, all throughout a system where data and processing are positively "C" entangled: data capacity returns processing power, and processing power returns data capacity.

All in all, and luckily, steadily pacedperformance up to constant verifiable factors is all that is needed under the U-Mentalism system, in a deep and low-level performance requirement RGB/binary enhancement only, wherein, unambiguously, arithmetic progression in FPS follows locally each digit power of two in binary, once decidability in terms of a machine $\mathcal{M}$ or $\mathcal{U}$ is said to be a decidable problem if there exists a corresponding $\mathcal{M}$ or $\mathcal{U}$ which halts on every input with either 0 or 1, thus low-level feeding the FPS arithmetic progression of large number mirror RGB images. This is, besides all, what makes it not constructive at all, and indeed counter-productive, any glimpse whatsoever over a hypothetical solution based on (typical) digital image decreasing measure overall pixel/bytes reconversion. An aforesaid presumptive choice of lesser resolution-say, maintaining the $16{:}9 = (4^2{:}3^2)$ ratio, $500 * 281.25$ (width * height) in pixels -would naturally decrease the computational power of the technology and, ergo, the overall scalability of the technology in relation to the cybernetic network on the Internet, under which a minor convolution of data and processing power altogether would impend on time complexity solvability.

What happens is exactly the contrary: the datasphere is too tiny when confronted with the power of U-Mentalism, to the point where well-ordered recollection and collection are pivotal not only to operability, but also to the progress of the technology.

More importantly, in the localist decidability of the pixel isomorphic RGB image of every binary octet resides the fundamental criterion of difference and repetition at which underlies the XOR or$Exclusive\ OR$ argument at the root of progression of binary numbers or, indeed, $mod\ 2$ addition.

If noticed, the progression $(00,01,10,11)$ corresponds to binary addition, after which completion the next two bits on the left are triggered to shift by half-addition, the same is saying, the double of the previous elements of the series of progression.

In other terms, it corresponds to a not equivalence NEQ difference and repetition operation in binary/RGB isomorphic arithmetic progression, wherein the proper R(ed), G(reen) & B(lue) are module operations. In this fashion, the whole (FPS) (typical) digital image becomes a truth-table,

for the reason that the lines and the columns (width * height) are themselves a sum operation, needing only a carry-out color/bit to the left when the progression (00,01,10,11) ends.

This would equate having in the binary logic and image sensing (and processing) unit, presumably, a two-color/bits *XOR* and *AND* adder. Naturally, because of the need of a full adder circuit for the entire (FPS) (typical) digital image, the binary/RGB isomorphic nature of the UTM(s) would rather, again presumably, be prone to use a two-bits/color *XOR*, *AND* and *OR*. Inasmuch as, for instance, in propositional calculus, laying the foundational bedrock of logic since Aristotle – considering the four different types of categorical propositions in the square of opposition, withstanding the syllogism theory - there are three propositions for each place-valued syllogism figure out of possible four. Thereupon, the possible total number of syllogism modes is four times that number, i.e., 256 logically possible distinct types. Because 256 is the same number of module 8 bits per RGB color in the (FPS) (typical) digital image, what this signifies is that, for the sake of the argument and hypothetically, an (FPS) (typical) digital image is a polysyllogism and a *calculus ratiocinator* $\mathcal{M}$.

However, and fundamentally, in U-Mentalism the CA is inverse and, thereupon, it is not built on binary/RGB, but instead RGB/binary. Without this judgement, it comes not to be transcendental. It shall produce wavelength colors and forms synthesis, just like φύσις (nature).

Due to the localist nature of both the pixel and of the whole (FPS) (typical) digital image, the RGB/binary isomorphic nature processed in the UTM(s) will be prone to use, not quite an equivalent color summands adder, but instead an every *n*-arycolor/bits RGB *imagetic* relations instant mirror, filter and mixer, always remembering that in between different modules and (FPS) films the exactly same holds true. What this means is that U-Mentalism is, at each UTM processing, constant metric localist, either in a pixel, a module, or the entire FPS, with equal time-dependent "film" computing power on the previous synchronous and orthogonal base for each (typical) digital image, *n*-arymodules or bytes.

In truth, the RGB/binary relation in the CA is always affected by a special bottleneck related with the communication with classic computation, as far as other much less grievous than the von Neumann bottleneck, which basically corresponds to the arithmetic logic unit binary mirroring of the RGB image codomain in case only of U-Mentalism scanner-to-printer or Eye-to-Brain, but except for machine learning, not in the case of U-Mentalism printer-to-scanner or Brain-to-Eye. If any bottleneck in the system exists that is worth mentioning it is, inevitably, what we choose to designate the unfolding "O" and "C" philosophy of (time) history bottleneck. The reason behind so is that computational means and resources up to this point of the "C" state-of-the-artdo not produce a reasonable amount of data as to test match the system, which is test halting (time) history itself. Before having a chance of escalation from one hour of one only film in the technology to a film of several hours, years, and even synthesis of the image metric distance, in the "C" movement-image, in light-seconds, (time) history "O" has, simply, to elapse. In contrast, as seen before, ["C"] computational time complexity in U-Mentalism has equally to elapse, although much more tied with bondless mathematical and dynamical limits, precisely on the grounds of the ["O"]constitutive transcendence on ["C"].

It is, ultimately, by virtue of this assertion that it is more appropriate to make mention of a general U-Mentalism "C"-"O" bottleneck, which is, by and on itself, a rectification of the classical von Neumann bottleneck. To alleviate any remaining doubts, it should be elucidated that the system is an inversion of the von Neumann CA, not only because of the RGB graphical primeval symbolic precedence, but also, amongst other aspects, of the inherent entanglement of data and processing power, which drives high latency, on a U-Mentalism turn, from being orderly unavoidable to well-orderly avoidable.

U-Mentalism, in this fashion, especially due to the diagonal method of computability beforehand, and of well-ordering collection also on the basis of the diagonal method of cryptography and permutation/combination, has a nature of transfinite (FPS) typical digital images, denumerable "image-movement" sets, with inherent cardinals and ordinals equipollence. For the moment it suffices to say that the nature of computable and definable numbers, as for the rest composite or prime numbers in U-Mentalism as "3 octets – 3 bytes" modules, typical digital images, or "films" is, intrinsically, a bijection of the well-ordered set of all finite ordinals in the system w_0 to cardinality $\aleph_0$. Therefore, an algorithm for an well-ordered collection of typical digital images in the system could easily resort to a typical diagonal on the binary basis and exceptionally reductionist.

Inquisitively, one can picture also, in an *Imitation Game* [4] register, or in a Turing Test flair, a different *dialogical* test. We shall call it for now both the U-Mentalist "O" inquiry and the "C" test. On the grounds that any (human or machine) synthesis of electromagnetic wave-like physical and symbolical impressions, susceptible of being, in turn, emitted in any body or technology, are to be, in quantized electromagnetic wave-like impressions in continuous spacetime, indiscernible in nature, the following questions arise:

Under U-Mentalism "O", we inquire if it is possible to be an observer without photons or any observable frame of reference in spacetime.

Under U-Mentalism "C" and likewise, we shall test if ever the prior impressed and, thus, emitted UTM(s) wave-like synthesis or images, in spite of the foreign face-to-face relation within a body of a presence in front of it, can be made discernible from the frame of reference of the observer.

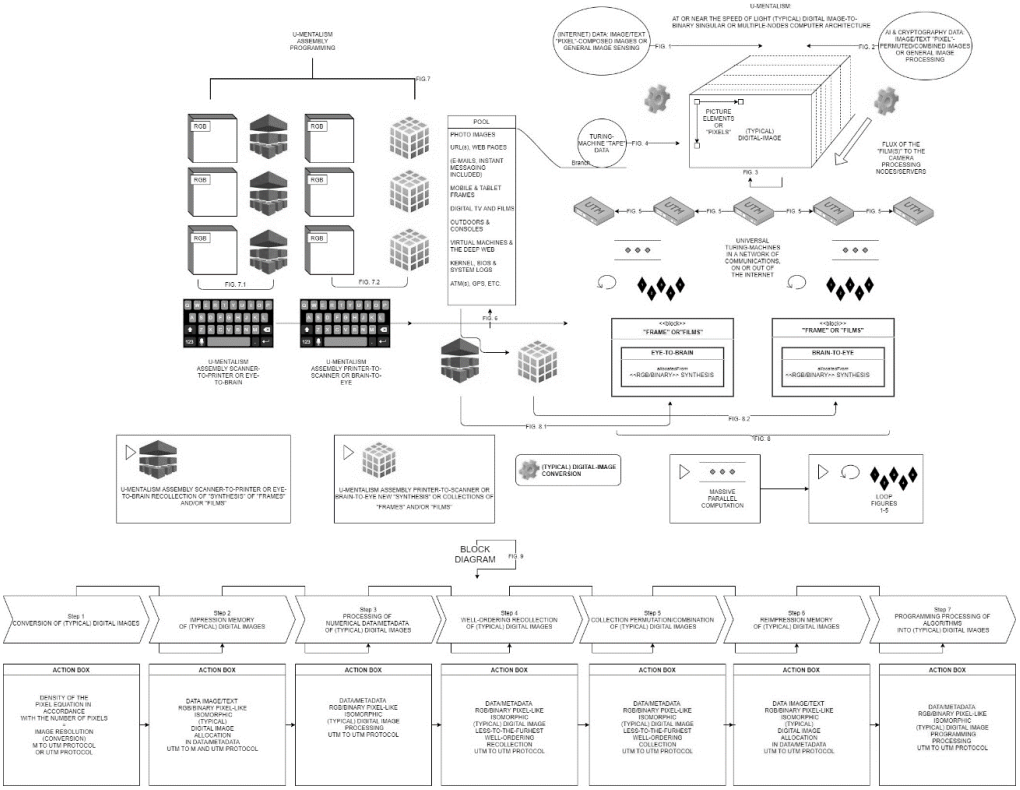

Figure 1. U-Mentalism Computer Architecture Design

3.2. U-Mentalism UTM(s) network analogy with current data nº1 TOP500 Linpack

Super-computation is often measured or estimated according to the floating-point (FLOPS) (additions and multiplications) computing power in the $\mathcal{M}$, under the numeric and scientific Fortran-derived linear equations in the LINPACK Benchmarks, taken as 64-bit floating-point peak performance. Besides being quite a multi-dimensional problem to address, and essentially a non-distributed supercomputer system ranking, it is the most reliable source for high-performance computing so to have a basis of comparison with the U-Mentalism CA, either distributed or non-distributed, in or out of a network, on or outside of the Internet. This is important to refer, once the CA is developed to be on distributed massive parallel computation with the most possible advanced cryptography methods on each UTM server/node (like open-source Blockchain), in a network, on the Internet. Any contrary application of the CA is envisaged as jeopardizing and, indeed, potentially very harming if ill-fated. It shall, hence, be laid open – *patere* (wherefrom the word patent derives) – for both public inspection and public policies, laws and interests of governments and the people. Once these aspects bring in multi-variables of which values is difficult to know, although being much easier to acknowledge approximations, and most specially orientated-guise measures of central tendency, normal distributions probability, and deterministic ranges, our method shall simply attain to the plausible measure for the intensity of the required memory per unit of performance, along the standard of FLOPS and bytes per FLOP (B/F).

Currently, the nº1 position of the 55^{th} TOP 500 following the LINPACK benchmarks suite (June 2020) is the Fugakupetascale (10^{15} floating-point operations per second = 1 petaFLOPS, i.e., a thousand million millions 64 bits operations per second) supercomputer. The Fugaku holds 415 petaFLOPS with a 158,976 (two types of) nodes Fujitsu TofuD, 6D mesh/torus Interconnect, in a A64FX CPU (48+4 core) per node CA, with a second-generation High Bandwidth Memory (HBM2) of 32 GiB/node.

Our next step is, thus, by multiplying Fugaku´s instance of cores * nodes (52*158,976 =8.266.752) find the equivalent processing power of the very same number of UTM(s) cameras/computer processing nodes/servers and later, having in mind that the Internet has around 50.000.000.000 nodes, well above the 10^{12} to 10^{24} FLOPS of all the existent computers (2015), at the end reasonably cut the latter figure by reason of factors such as entrance in the industry, price and energy, besides any hindering variables, thus obtaining a fair value for the CA implementation in the network of networks, i.e., on the Internet.

First off, the value of $21.499085 * 10^{15}$ Zettabytes of one only "film" of one hour in U-Mentalism divided by the number of cores * nodes (52*158,976 = 8.266.752), equals $2.6006689e + 15$ Zettabyes, which converted is 2.6006689e+15 Petabytes. Therefore, assuming a 64 bits operation, we have roughly 325083615.064 PetaFLOPS per each server/node out of 8.266.752 in the technology, if U-Mentalism was to have the same number of nodes/servers on the Internet, presumably settled for a start on an Internet with an even much bigger number of nodes. And even if there would never be the same number of servers as nodes, in reality and at present the Internet detains around 50.000.000.000 nodes.

In abstract, the value divided by the computer performance of the Fugaku supercomputer indicates that one only hour of one only "film" in the technology would equate to 783334.012203 times the nº1 position of the TOP 500 Linpack benchmark as of October 2020. In reverse manner, we could affirm that the 415 overall petaFLOPS of the Fugaku supercomputer, compared with the 597196805556 Zettabytes/per second (or 597196.805556

Petabytes/per second) in U-Mentalism, stipulates that a presumed value in 64 bits (74649.6006944) petaFLOPS/per second in U-Mentalism is, in itself, 179.87855589 times more than the overall performance of the Sugaku supercomputer.

The extreme low latency of the invention is best shown if we divide the overall abstract performance of U-Mentalism of petaFLOPS/per hour (2.6006689e+15) by the actual number of Internet nodes (50.000.000.000). The result is 52013.378 petaFLOPS per each one out of 50.000.000.000 Internet nodes, when indeed, chances are not only that the divisor will be much larger, but essentially that the number of typical digital images reaching the system will be exponentially wider. Confronting with the Sugaku supercomputer, this would mean that at each one of these 50.000.000.000 nodes, it would be instantiated 125.333440964 times more the performance peak of the Fugaku supercomputer in PetaFLOPS.

Nevertheless, because the hindering variables are numerous and immense, even though we are experimenting values with greatly sub-optimized inherent values (pixel resolution, FPS, Hz, and subordinate processing-time of the technology to one-hour only), we shall now, thinking ahead the barriers to the entrance in the industry in terms of price, energy, etc., cut the preliminary values to around 20%. Thus, the result at hand is, under one such 20% cut under the very same parameters, of65016.7225 PetaFLOPSfor each one out of 50.000.000.000 Internet nodes, which equates to 100.266752771 times more the performance peak of the Fugaku supercomputer, measured in PetaFLOPS for the very same value of each one out of the 50.000.000.000 Internet nodes.

One such technology shall be exclusively scientifically-driven. In fact, in terms of the stored-program concept, we can designate it, in in differentiable manner, (φύσις) science, if granted that the overall feedback and cybernetic loop mechanism, that we choose to call an "algorithmitron", i.e., an accelerating mechanism for all classes of algorithms, and thus a procedure on its own, is itself well-ordered within the *extensional* and *intensional* self-image of man and the cosmos that is (φύσις) nature. The extensional and intensional philosophical synthesis and programing regulative idea shall be explored in recurrence and recursively.

Very concretely, the actual example provided by the current use of the nº1 TOP 500 Linpack benchmark Fugaku Japanese supercomputer, which has presently been used for COVID-19 research, and the nº2 TOP 500 North-American supercomputer Summit, whose current work with scientific impact is on various levels (deep learning for human systems biology, plasma fusion simulation, combustion in turbulent environments, stellar astrophysics nuclear burning, cancer treatment and surveillance planning, high-temperature superconductors) are nothing but just a pale *coup d'oeil* of what can be, at a greater extent, achieved with the forthcoming fabrication. By all means, U-Mentalism participative and all-engaging cultural-scientific accelerator, social and technological, financial and political, inter-dependability and transparency, shall act as new measures for the human. We have to remember, for that purpose, that a world with a 24 hours "film" in the technology, however $1.2285191e+14$ times the value of 175 Zettabytes (estimation of global data for 2025) with the necessary equivalent data input, thus dependent on the U-Mentalism "C"-"O" bottleneck, would grant the CA with a processing power of $5.1597804e+17$ Zettabyes ($21.499085 * 24 * 10^{15}$). The same is valid for "films" of several years, and even of the "image"-distance in light-seconds, most assuredly in prospective proper physicalist-reductionist underpinnings, rather than merely technological.

Yet, more frequently than not in dialectic terms, time and history itself naturally supersede and are transcendent in relation to any object (such as technology). In fact, the author suggests that the contemporary crisis in philosophy of science (φύσις) points out to the extreme of that reality. If any peak in civilization was possible to be found, it definitely was the period from the birth of

Classical Greece up to the end of the Hellenistic period, from classical Athens to the Hellenistic Alexandria. It worked as a natural philosophy (φύσις) explosion or radiation, all throughout two millennia with tergiversated and fragile-weaved, often sinuous paths on the edge of eradication, as epiphenomenon's echoes throughout the Roman and Byzantine, Islamic and Indian Empires, before the turning from Medieval times to the European Renaissance, and thereupon Modernity and Contemporaneity, that was afterwards, arguably, to see its dimmest resonate and last hour in XXth century Vienna. This serves to explain the non-mutual relation between progress and technology. More so, sometimes the value of a technology is best evaluated if tested against the worst demeanors and actions known to the history of civilizations. For example, in substitution of a colossal computing and processing power, the technology of U-Mentalism could benefit more from improvements in cryptography, or primarily human-agent decisions.

Coming to think of it, and bearing in mind imaging and sensing technology latent in U-Mentalism - metal–oxide–semiconductor (MOS) based charged-coupled devices (CCD), and active-pixel sensors (CMOS) in the present state-of-the-art, prior to the reductionist more general "cell"-like synthesis–we can think of two unexpected, but conceivable and tenable breakthroughs cognate with the technology that are worth to be referred.

One is, definitely, the use of biopolymers as paper for the use of electronic applications, namely paper transistors recurring to metal oxide semiconductor (MOS), complementary (CMOS) circuits, and eventually transparent conductive oxides, i.e., paper-based electronics or papertronics [5, 6]. Most importantly in the case of a simple and universal device architecture in correlation with the novel U-Mentalism CA, it could literally be possible having always and ever a paper copy of every book in the world in the same paper organic substrate, also electronic component (dielectric), and charge storage media, an upturn revival of the inceptive idea of the Great Library of Alexandria and Mouseion since Ptolemy Soter I, center of Hellenistic civilization and epitome of Classical Greece, where the study of natural philosophy (φύσις) found its ἀκμή(acme).

The other conceivable breakthrough is directly correlated with the possible use of transparent oxide electronics as a backbone to U-Mentalism Assembly Language programming. Because in U-Mentalism there will be the need to instruct in symbolic RGB/bytes machine code modules, "frames" and "films" through instances of time in tunnels of "pixels" or, in fact, any other instances of "cell"-like exponential-prone alike basis, having access to novel semi-conductor amorphous oxides or applications with high transparency and electrical conductivity, can open the gates to create an endless array of philosophical and programming short-cuts over typical digital images. In reality, beyond Thin Film Transistors ("active matrix" TFT), Liquid Crystal Display ("passive matrix" LCD), and Organic Light Emitting Diode (OLED), the transparent semiconducting oxides (TSOs) and transparent conducting oxides (TCOs) can help the technology to directly assemble the building block-structure-luminous response mechanism itself, bridging optoelectronics with programming, and possibly breaching into Photo-Voltaic modules (PV or solar panels) or electronics Organic Solar Cells (OSC), including polymer solar cells.

Lastly, the author would like to reiterate the U-Mentalism "O"-to-"C" cybernetic analogy with photosynthesis, the very definition of "synthesis of light", already expanded in a preliminary paper, in all likelihood with improved understanding as of now close to the conclusion:

U-Mentalism is mainly intended to be a programming synthesis of light through typical (digital) images, organized as symbolic-informational truth-equivalent programming language abstracts. Photosynthesis puts together a synthesis of light, carbon dioxide and water into glucose at reaction centre proteins with chlorophyll (digital images), wherein to the fore roots have absorbed water (computability) from the soil, through the stem (programming language abstracts and

paradigms) and through the leaves (programming languages). This is why to the exact chlorophyll complementary light (diagonalization) absorbance centre chloroplast organelle (pixel) there is, at large, a leaf lamina (frame), as a surface area to capture the light, under light's every possible and each necessary time-image. There is, in the overall process of photosynthesis, a light-dependent cycle and a light-independent cycle. In the light-dependent or light cycle (scanner-kinescope), as an effect, short-term stores of energy are produced, enabling their transfer to drive other reactions (computer vision & multiple-view geometry; U-Mentalism Recollection), while in the light-independent cycle (printer-iconoscope; U-Mentalism Collection), the so called Calvin cycle, the atmospheric carbon dioxide is incorporated into organic carbon compounds (U-Mentalism Assembly Language Programming), and dependent on the previous light-dependent reactions (semantic isomorphic correspondence), are then used to form further carbohydrates, such as glucose, the most important source of energy metabolism in bioenergetics (cybernetics) [1].

4. CONCLUSIONS

In the present study, following closely the theoretical and practical keystone of the provisional Patent Application at INPI (Portuguese Institute of Industrial Property) (nº 116408), designated as U-Mentalism, a method to perform computation at or near the speed of light, resorting to "(typical) digital image" RGB-to-binary in singular or multiple nodes/serversin a network, on the Internet, in its entirety a philosophically-meaningful new computer architecture, is displayed its simplest baseline, adjustable for the research and industry communities. Foremost, the proper discrepancy between the imagetic frame of reference of U-Mentalism in relation to the "O(ntological)" and "C(omputational)" approaches is elucidated. No substitute of the latter can prepare ahead the in-depth comprehension of the intrinsic method of typical digital images coincident with non-standard positional numeration base with isomorphic many-bijective modules recursive powers. Ensuing, typical digital images permutations in partial and distributed UTM(s) in a network, on the Internet, is shown to be the proper context for the technology to be undertaken, which suits the passage to a vaguely prosaic, but matter-of-fact indisputable, comparison of the fundamentally futuristic trait of the invention with the current data nº1 TOP500 Linpack supercomputer as of November 2020, the Fugaku supercomputer at the RIKEN Center for Computational Science in Kobe, Japan.

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