

# The singularity is near philosophy essay

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Singularity describes an era of 21 century in which humanity will stand on the precipice of most transforming period in its history. The wed-lock of human and machine in which skills and knowledge embedded in our brains will be combined with much greater speed, capacity and ability of knowledge sharing. That merger is the essence of singularity. In future our intelligence will become non-biological and trillion of times more powerful than it is today. The dawning of new civilization in which there is no clear distinction between human and machine. Singularity is near maintained the optimistic view of future and course of human development. The main postulates of this research paper are given below. Singularity exists as an evolutionary point in technology for humanity. The functions of human brain are quantifiable in terms of technology we build in future. Technology is moving towards singularity through a law of accelerating return. Singularity will change the past perspectives of human being. The key idea of singularity is that the rapid change in human created technology is accelerating and its powers are enhancing at large rate. However information based technologies surround proficiency and knowledge. Including pattern recognition powers, emotional and morel intelligence of human brain, and problem solving skills. Although brain has severe limitations, by using massive parallelism (one hundred trillion inter-neuronal connection operating simultaneously) in order to quickly recognize the subtle pattern. Speed of human thinking is very slow then contemporary circuits that are faster than the basic neural transaction, contemporary circuit makes our physiological bandwidth for processing new information. Singularity allows the humans to exceed from this biological limitation of body and brain. Humans will fully understand the thinking and functionality of human brain and will expand it. At the end of 21 century the <https://assignbuster.com/the-singularity-is-near-philosophy-essay/>

non-biological part of human intelligence will be trillion of trillion times more powerful than human intelligence. In future singularity will represent the highest point of the union of our biological thinking and existence with our technology. Singularity has many faces, one of its important implications is that humanity exceeds the refinement and suppleness of what humanity regards as the best of their traits. SIX EPOCHS This section covers the emphasis on the concepts of pattern. Evolution is the process in which creates pattern in increasing order. This process work through in direction: each epoch or plate form uses information processing technique of previous epoch to create next epoch. As we will further discuss, the singularity incepts with epoch five and will extend widely from the earth to throughout the universe in epoch six. Epoch One: Physics & Chemistry: In epoch one origin is trace out to a state that represent information in its elementary structure. In modern theories of quantum gravity describes that space and time are broken down into discrete quanta. There is a conflict as to whether energy and matter are ultimately digital or analog. The rules of universe and the balance of physical constant that governs the interaction of basic forces are so delicate, exquisite and appropriate for codification and evolution of information. But it's clear and vivid that physical laws of universe are precisely what they need to be allowing for the evolution of enlarging level of order and complexity. Epoch Two: Biology and DNA: Epoch two describes millions years ago, when carbon based compound became more and more intricate until complex aggregation of molecules formed having self-replicating mechanism, and life originated. Ultimately an advance biological system evolved having a precise digital mechanism (DNA) for storing information which describes a large society of molecules. These molecules

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and its supporting machinery of codons and ribosomes enable a record to be kept of the evolutionary experiment of this second epoch. Epoch Three: Brain: The evolution of information in each epoch continues through a paradigm shift to a further level of indirection (i. e. to create next epoch evolution uses the results of epoch one) for example in epoch third, DNA guided evolution produced organism which can detect information with the help of their own sensory organs and process and store the related information in their own brain and nerve systems. These were achieved by epoch two mechanism (epigenetic information of protein, DNA and RNA fragments control gene expression) which initialized and defines information processing mechanism of epoch three (the brain and nerve system of organism). Third epoch incepts with the ability to recognize pattern which has vast majority of activity in our brains. Our own species evolves the ability to create abstract mental models of the world we experience and to contemplate the rational implication of these models. We have such abilities to create and design our own models and put our ideas into actions. Epoch Four: Technology: Combining the abstract thoughts of brain our species ushered in fourth epoch and in the next level of indirection. The evolution of human created technology, this was incepted with the basic mechanism and developed into elaborate automata (automated mechanical machine). With the sophisticated computational and communicational devices, technology it's self has the ability for storing, sensing and evaluating elaborate patterns of information, to distinguish between the rate of progress of that biological evolution of intelligence to that evolution in technology. Epoch Five: The Merger Of Human Technology With Human Intelligence: Fifth epoch describes the inception of singularity resulting with the merger of vast

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knowledge embedded in brains with great speed and capacity and knowledge sharing ability of our technology. The fifth epoch enables the human-machine civilization to transcend the brain limitation of mere hundred trillion extremely slow connections. Singularity will overcome the old age problems and amplify the human creativity. Singularity will enhance human intelligence, and also amplify the ability to act on destructive inclination so the full story has not been written yet. Epoch Six: The Universe Wakes Up: In final epoch the singularity, intelligence is derived from brain's biological origin, and its technological origin in human ingenuity, it will initialize to saturate energy and matter in its midst. It will accomplish this by reorganizing matter and energy to provide an optimal level of computation (based on some specific limits) to spread out on earth from its origin. We take speed of light as a bounding factor of transfer of information circumventing the limit there is hint that this constrain may be able to superseded. In any event matter and mechanism will be transformed in to sublime form of intelligence which will constitute sixth epoch in the evolution of pattern information. Which is the ultimate destiny of singularity and of universe? PRINCIPLES OF SINGULARITYThe singularity involves some following principle which will be developed, analyzed; contemplate throughout the rest of research. Obtaining the tool to reverse engineer (decode) the human brain's principles of operation. We will have a requisite hardware to emulate the human intelligence with super computer. We will have effective software model of human intelligence in the mid of 2020. Both hardware and software is needed to fully emulate the human intelligence, we can expect from the computers that they are capable to pass the Turing test, which indicates that intelligence is indistinguishable from human biological

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intelligence. After achieving this development level, computers are able to combine the traditional strength of human intelligence with the strength of machine intelligence. The traditional strength of human intelligence includes a formidable ability to recognize pattern. The massively parallel and self-organizing in nature. The traditional strength of machine intelligence includes the capability to remember trillions of facts precisely and call them instantly. Another benefit of non-biological intelligence is that once the skill is mastered it can be performed repeatedly at extremely high speed at optimal accuracy and without tiring. Non-biological intelligence are able to download skills and knowledge from the other different machine, eventually also from human beings. Machine will process the signal at close to speed of light (about three hundred million meter per second) as compare to biological mammalian brain (about one hundred meter per second for electrochemical signals). The speed ratio is three million to one. Machine will be able to access all the knowledge via internet of our all human-machine civilization, and will be able to master all of these knowledge and skills. Machine are bale to pool their resources, intelligence, and memories, two or more up to one hundred million machine can combine together to become one machine and then become separate again. Multiple machine can do both at the same time. i. e. one and become separate simultaneously. Machines will have complete freedom of architecture and design (that is, they won't be constrained by biological limitations like slow switching speed of interneuron connections and fixed skull size) and consistent performance all the time as well. Once machine achieved the ability to engineer and design technology like humans do, at higher speed and capacity they will access to their own design (source code) and the ability to manipulate them. The cycle of machine

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intelligence iteratively improving its own design which will to become faster and faster. Through the improved cycle of non-biological intelligence nanotechnology enable the manipulation of molecular level and physical reality. Nanotechnology will enable to design Nano-bots; robots are architecture and designed at molecular level, measured in microns (millionth of meter) such as resiprocites (mechanical red blood cells). Nano-bots interacts with biological neurons to vastly extend the human experience by creating virtual reality with in the nerve system. Trillions of Nano-bots in the capillaries of brain will enhance the human intelligence at very large rate. Once non-biological intelligence implanted in human's brain (this has started already with computerized neural implant). Nano-bots will enhance the environment by reversing pollution from earlier industrialization. The Nano-bots are called foglets that can manipulate sound wave and image will bring the morphing qualities of virtual reality to the real world. This is then the singularity; some would say that we cannot comprehend it, at least our current level of understanding, for that reason we don't look past its event horizon what lies beyond that are why we call this transformation singularity.

#### THE SIXTH PARADIGM OF COMPUTING TECHNOLOGY: THREE DIMENSIONAL MOLECULAR COMPUTING AND EMERGING COMPUTATIONAL TECHNOLOGY

In the sixth paradigm new technology will lead us to one of the most advance door step of computer technology that is molecular three-dimensional computing which includes Nano-tubes and Nano-tube Circuitry, molecular computing, self-assembly in Nano-tube circuitry, biological system emulating circuitry, computing with DNA, spintronics (computing with spin of electrons), computing with quantum and computing with light. Any of these technologies can be integrated into computational system that will approach <https://assignbuster.com/the-singularity-is-near-philosophy-essay/>

the maximum capacity of matter and energy to perform computations and will far outpace the capacities of human brain. One of these approaches is to build three dimension circuit by using "conventional" silicon lithography. Since a single 3-d chip can hold more memory as compare to matrix semiconductor containing vertically staked planes of transistors rather than a one flat layer. So the whole size is reduced. So matrix is targeting portable electronics where it aims to compete flash memory(that does not lose information when the power is turned-off). Working prototype of three dimensional has also been demonstrated at renselaer poly-technique institute. Tokyo Nippon's Telegraph and Telephone Corporation has demonstrated a 3-d technology using electron beam lithography which created arbitrary three dimensional structures with feature sizes (such as transistors) as small as ten Nanometers. Technology is demonstrated by creating high-resolution model of earth sixty microns in size with ten nanometer features. This technology is applicable to nanofabrication of electronic devices like semi-conductors as well as creating nano-scale mechanical systems. NANOTUBES ARE STILL THE BEST BET Nanotubes uses molecules organized in three dimensions to store memory bits and act as a logic gates. As most likely technology to usher in the era of three dimensional molecular computing. Nanotubes, are synthesized in 1991, tubes are made up of a hexagonal network of carbon atoms that have rolled up to make a seamless cylinder. Nanotubes are extremely small single walled nanotubes are one nanometer in diameter only. So they are able to achieve high densities. They are very fast potentially. Theoretical speed limit of these nanotubes is (1THz= 1000GHz), which is 1000 times faster than modern computer speed. One cubic inch of nanotube, once completely

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developed would be up to one hundred trillion times faster than human brain. One of the challenges using this technology is that some nano tubes are conductive (simply transmit electricity) while some act as a semi-conductor (capable of switching and able to implement logic gates). Lining up the nanotubes is another challenge with nanotube circuitry, since they tends to grow in every direction. Computing With Molecules: In addition to nanotubes, in recent year's major progress have been made in computing with one or few molecules. The idea of molecular computing was first suggested in 1970's. at that time there is no enabling technology which required advances in electronics, physics, and chemistry, and even reverse engineering of biological process to gain traction to idea. Afterwards atomics drive was created which uses atom to emulate hard drive. Single silicon atoms could be added or removed from the block of twenty. Using this process system could store millions of times more data on a disk of comparable size. A density of 250 tera bits per square. One tera hertz speed of molecular circuit looks accurate. One type of molecule have found that appears to have desirable properties for computing called " rotaxane" which is capable of switching its state by changing its energy level of ring like structure consisting with in the molecules. Rotaxane memory and electronics are capable of storing one hundred giga bytes per square inch. It would be greater if organized in three dimensions. Computing With DNA: DNA is a kind of nature's own nano-engineered computer. And it has the ability to store information and conduct logical manipulation at molecular level. The term is already been exploited in specialized" DNA Computer". A DNA compute is actually a test tube filled with water holding trillions of DNA molecules in it. And each molecule acting as a computer. The fundamental goal of

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computation is to provide solution to related problems. This is expressed in term of sequence of symbols. Initially a tiny strand of DNA is created by using a special code for each symbol. Each of the strand is replicated trillions of time by a special process named as " Polymerase Chain Reaction" (PCR). Than these pools of DNA is put into a test tube. Because of the affinity in DNA strands are linked to gather. Long strands with its specific sequence are formed automatically representing unique symbols. Each of the symbols represents possible solution to a related problem. As there will be many trillion of such type of strands, so multiple strands represent possible solution to a problem. The next step of this process is to test all the strands simultaneously. This is achieved by the use of specially designed enzymes that demolish those strands that do not meet a certain criteria. Then all these enzymes are applied to the test tube in chronological order. And by designing a precise series of enzymes the procedure will ultimately obliterate all incorrect strands leaving behind only with the correct answer. The reason to the power of DNA computing is that it allows testing for each of trillion strands simultaneously. However there is a limitation to DNA computing that is, each of trillions of computer has to perform same operation at the same time but on different data, so that device refer to as " Single Instruction Multiple Data"(SIMD) architecture. The problem to SIMD architecture is, they are not program for general purpose algorithm. In which computer is able to carried out whatever operation is needed for a pertaining mission. Computing With Spin: Negatively charged electrons have an ultimate property that they can be exploited from computation: spin and memory. According to quantum mechanics theory, electron spins on an axis as similar to the way the earth rotates on its axis. However when an

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electrical charge moves producing magnetic field which is real and can be measured. Electron has the capability to move one of two directions mean (up and down). This property is useful for logical switching and to encode bits of memory. This exciting property of spintronics states that no energy is required or needed to change the electron's spin state. One form of spintronics is familiar to the computer users: Magneto-resistance (change in electrical resistance caused by magnetic field) is used to store data in magnetic hard drives. A new form of non-volatile memory based on spintronics MRAM (Magnetic Random Access Memory) will be introduced in future which will cover the principle of hard drives i. e. data will be retain in the MRAM even there is no power and with work extremely great speed as compare to conventional RAMs. The MRAM stores information in ferromagnetic alloy suitable for storage devices but not for microprocessor. The practical implementation of spintronics effects in a semi-conductor. Enabling to use technology for both logics and for memory. Thus an influence of spintronics in future of compute memory is clear and vivid which will further contribute in the logic systems as well. The spin of electrons is related with the quantum property (subjected to laws of quantum mechanics). So ultimately application of spintronics exists in quantum computing systems. By using quantum-entangled electrons which represent qubits. Another use of spin is that it stores information in nucleus. Using complex interaction with their protons and their magnetic moments.

Computing With Light: Computing with the light is another most advanced approach to SIMD computing, allowing multiple beam of laser light in which information is embedded in each stream of photon. Optical components are also used to perform arithmetic and logical function on the encoded stream

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of information. Both SIMDs technologies such as DNA Computing and optical computing will play an extensive role in the future of computation. These replicating aspects of the functionality of brain such as processing sensory data are able to use SIMD architecture. While other regions of the brain such as learning, dealing and general purpose computing with it " Multiple instruction Multiple Data" (MIMD) architecture will be required for this purpose. It required three-dimension molecular computing paradigms for the optimal performance of MIMD Computing. THE COMPUTATIONAL CAPACITY OF HUMAN BRAIN A number of estimate have been made over the computational capacity of human brain by replicating the functionality of brain region that have reverse engineered (i. e. method understood) at the performance of human level. Once the computational capacity of particular region is estimated, we can infer that capacity to entire brain by considering what each region of brain represents. These aspects have been estimated on the bases of functional simulation that replicates overall functionalities of region. Except of simulating each neuron and interneuron connection in that particular region. Singularity a future prediction, an enhancement in the human intelligence by a factor of trillions through merger of its non-biological form, does not depends on the precision of this calculation. If the estimated amount of computation required simulating the brain was optimistic by a factor of even one thousand year. Then it would delay the singularity by only eight years. A fact of million would delay about fifteen years. A factor of one billion years would delay only twenty one year. However functionalities of brain region can be emulated with less computation and simulate precisely the non-linear operation of neurons and all of its components. This means the entire complex interaction take place

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in each neuron. Functional simulation of brain is enough to re-create the human powers of pattern recognition, emotional and intellectual intelligence. On the other hand if a particular personality of a person is uploaded (that is all of his/her knowledge, skills and personality). Then neural processes at the individual neuron and portion of neuron are simulated. Such as soma (cell body) axon (output connection) dendrites (trees of incoming connection) the fan out (number of interneuron connections) for this reason we have to take a detailed view over the model of individual neurons. Human neurons are extensive creation; however most of the complexity of human neurons is maintain its life support functions, but not its information processing capabilities.

#### HOW TO REVERSE ENGINEER THE BRAIN

The term reverse engineering the brain mean look inside it re-model it and simulate its region. The first step in reverse engineering the brain is to look closely into the brain to find out it works. Tools are crude for this purpose but its changing now as significant number of new scanning technologies. Data is accumulating on the precise characteristics and dynamic constituent parts and system of brain. Information can be understand and applied by building models and working simulation. Basically these simulations of brain region are fundamentally based on the principles of mathematical complexity, chaotic computing and theory. Reverse engineer the operating principle of human intelligence and replicate its capabilities in the more powerful computational substrate are difficult and complex, but they will be available in next decades.

#### SOFTWARE OF THE BRAIN

The computational capacity of hardware is essential but not enough, to understand the organization and contents of these resources software of intelligence is more critical and objective of the brain reverse engineering. The advantage of non-biological intelligence is

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that machine is able to share their knowledge. Once machine achieve the level of human intelligence. It necessary soars past it. Neurotransmitter concentration (level of chemical in synapses that allow one neuron to influence over another) and interneuron connection (portion of neuron called axon and dendrites that connect neurons). Developing software of brain means to develop such type of software which can control the artificial neurons (Nano-Bots) and interact with the biological neurons of human brain. By achieving the software of human brain Nano-bots can be easily implanted and easily handled and perform trillions of times faster than a biological intelligence. BRAIN SCANNING USING NANO-BOTS This includes noninvasive scanning which means scanning the brain from outside the skull. The most powerful approach that captures every salient detail of neurons will be to scan it from inside the skull. By the end of this decade Nano-bot technology will be viable and scanning brain is one of its prominent implementation. As discussed above Nano-bots are the robots having size of human blood cells (about seven or eight microns) or even more smaller in size? Billions of them could travel through every capillary existing in the brain. Scanning each and every relevant detail from up. By high speed wireless communication Nano-bots will be able to communicate with each other and with the system compiling brain scan database (in other words Nano-bots and computer system will be on wireless local area network). The major challenge is to designing such type of interface that Nano-bots with biological brain structures is the blood brain barrier. This barrier protects the brain from wide range of harm full substances in the blood. Like bacteria, hormones, and chemical that may act as neurotransmitter and other toxins. Only glucose and oxygen and other selected set of other small molecules are able to leave

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blood vessels and enter in the human brain. Any design of Nano-bots to probe or then intermingle with the brain has to consider BBB. An intermediary tactic would preserve the Nano-bots in the blood stream but to have it plan it a robotic arms over the BBB into the extracellular fluid that lines the neural cells. By this Nano-bots sustain large ample to have adequate computational and navigational assets. Bypassing the blood stream and BBB altogether by inserting Nano-bots into the areas of human brain that have straight contact to neural tissues. New neurons transfer from the a ventricles to the other parts of brain. Nano-bots will trail the same path. Once we comprehend the neural wiring design with in the region we can cartel those facts with aspect appreciative of how every type of neuron in that region activates. ARTIFICIAL NEURONS An artificial neuron is a precise utility regarded as a rudimentary model, or concept of biological neurons. Artificial neurons are the constitutive pieces in an artificial neural network. Liable on the precise model used. The artificial neuron gets one or more inputs (on behalf of the one or more dendrites) and sums them to yield an output (synapse). Usually the sums of each node are biased, and the sum is passed through a non-linear function known as an activation function or transfer function. The artificial neuron transmission task should not be muddled with an undeviating system's transfer function. The transfer function of a neuron is elected to have a number of chattels which either enhance or shorten the network having the neuron. Artificial neurons of artless types are occasionally pigeonholed that they are anticipated to replicate one or more neurophysiological annotations, but without repute to sanity. Computing with the neurons is often called chaotic computing, in which each neuron act in an unpredictable fashion, when an entire network

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of neuron receives input the signaling among them appears to be frenzied and random. Although there is a great complexity and non-linearity in sub neural parts of each neurons. The above diagrams showing the replacement of a biological neuron with non-biological neurons in unpredictable fashion. These diagrams show that how Nano-bots will interact with our non-biological neurons. Neural Network: Neural network describes a network or circuit of neurons, the advance usage of the term often related to artificial neural networks, that are composed of artificial neurons or nodes. Thus the terminology has two different ideas. Biological neural networks are composed of real biological neurons that are linked or functionally associated in the major nervous system or the main nervous system. In the field of neuroscience, they are often recognized as groups of neurons that act as a specific physiological function in laboratory assessment. Artificial neural networks are made up of interlinked artificial neurons (programming constructs enables them to imitate biological neurons). Artificial neural networks either are used to gain a comprehending of biological neural networks, or for the purpose of solving artificial intelligence problems without essentially creating a design of a real biological architecture. The real, biological nervous skeleton is extremely complex and contain some salient features that seem optimistic based on some comprehending's of artificial networks. Generally biological neural networks are made up of a group or groups of chemically linked or functionally interconnected neurons. A single neuron appears to be connected to other neurons and total amount of neurons and connections in a network is extensive. Connections, called synapses, are usually designed from axons to dendrites, though dendrodendritic microcircuits and other connections are possible with in this <https://assignbuster.com/the-singularity-is-near-philosophy-essay/>



context. A portion from the electrical signaling, other types of signaling that originated from neurotransmitter diffusion, which have an impact on electrical signaling. because neural networks are complex extremely.

### INTERFACING THE BRAIN AND MACHINE

Comprehending the essential methods of brain will helps to design biologically ecstatic machine in the same way. It is one of the most advanced application will be to interface our computers with the brains. This will become an advance joint merger in the next few decades. A key remonstrance in linking neural implants with biological neurons is that biological neurons generate glial cells, which surrounds a foreign instance in an attempt to guard the brain. However a special coating will remove this knot and there for adhere rather than repel nearby neurons. We have studied how to interface surgically equipped neural implants. In cochlear (inner-ear) implant it has been found that auditory nerves tend to reorganizing themselves in order to correctly elucidate the multichannel from implants. The same process will take place in deep brain stimulation implants. The biological neurons in the locality of this implant receives signal from an electronic device and responds at the same time as the signals receives from biological neurons. Implants have the ability to download and upgrade its software directly to the implant from outside.

### UPLOADING THE BRAIN

A more contentious pertinence than scanning the brain. Its sketch is scanning the human brain to upload it. Uploading brain means scanning its entire salient feature in detail and then instantiating those details in to a suitably powerful computational substrate. This process would capture person entire personality, skills, memory and history. Truly capturing the mental process and then instantiating mind will need a body; much of our thinking is directed towards physical desires and

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needs. However tools are available in future to re-create human brain with all of its subtleties, there are plenty of options that bodies of human of 21 century are capable for extending their intelligence biologically and non-biologically. One can upload a human brain by obtaining all the essential details without necessarily comprehending the brain's plan. To capture detail at this level require brain scanning using Nano-bots, this technology will be available within the next few years. Within the next few years the time frame computational performance, memory, and brain scanning pre-requisites like other technology it will take some iterative refinement to perfect this capability. Nano-bots will be further used to initiate augmenting human brains with non-biological intelligence, for this there are variety of implants that can be used for uploading the brains essential properties like, skill, memory, personality, moving skills formation, pattern recognition, logical analysis. This non-biological thinking will profoundly transform the human civilization. GNR (THE THREE OVERLAPPING REVOLUTION)The first half of twenty first century will be characterized by three overlapping revolutions that are Genetics, Nanotechnology, and Robotics. These usher referred earlier in epoch five, the beginning of singularity, in early stages there is revolution in " G". The " N" revolution enables to rebuild and redesign molecule by molecule brains and bodies and the world with which it interact, going beyond the limitation of biology. The most advance, powerful and extremely optimistic revolution is " R", human level robots with their designed intelligence extracted from human brains but will exceed human capabilities. R represents most significant transformation, because intelligence is the most powerful force all over universe. Sufficient advancement in the intelligence would be enough to anticipate and

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overcome any obstacle that stands in its path." G" will overcome the aged-old difficulties, " N" is fully developed once and will be able to apply to protect from biological hazards, but it create its own self-replicating dangers, which will be more powerful than any other biological. Civilization is protected from these hazards by fully developed " R". When the singularity initiates these most powerful pillars of universe will be so advanced it become impossible that new civilization will be unable to live without it. When these three above mentioned powers are combined a new world will came into being in its hard to say that nothing in impossible.