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# Quantum Control based on Intuitive & Counterintuitive Perceptions

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## Abstract

Human intelligence is rooted in perceptions, both **intuitive** and ***counterintuitive***. Digitization of them, we have appropriately Artificial Intelligence and Quantum Intelligence and related computing techniques based on either traditional NN computing, using intuitive perceptions in the framework of classical physics for artificial control, **AC**, or quantum computing using counterintuitive perceptions in the framework of quantum physics for quantum control, **QC**, which plays an important role in quantum information processing, where manipulation of quantum bits, **qubits**, realized in quantum computers. It goes beyond the scope of conventional computing, allowing us to change the way we analyze numbers, creating powerful transformations in cybersecurity, quantum control, quantum medicine, the military, and many other fields.

**Keywords:** Artificial control; Quantum control; Intuitive perception; Counterintuitive perception; Cognitive processing

## Introduction

When we experience what we consider to be reality, which is a limit to what can be known of the so-called objective reality, through our organ-senses, first intuitive perception, which we can describe through common language and Boolean numbers within the syntax constraints contained in the framework of two-valued logic. Also, there is a world of particles, energy and potential, a world of atoms and subatomic particles that do not obey the known laws of physics. We have relationships with other part of the true reality through high level cognitive responses. It is strictly limited to brain-based processing in order to create an interface for another reality - subjective reality, we cannot perceive it by intuitive perception. It is the quantum world, a world where everything is in a state of potentiality, inseparable until it is observed. What we receipt from that, through counterintuitive perception, its description is beyond limits of common language and Boolean numbers. Objects created together are entangled with each other, if separated they are able to communicate with each other and communication is received instantly, independent of traditional space and time, no matter how far apart they may be (Quantum Entanglement). It leads to new knowledge under semantic and pragmatic respects in the framework of epistemology including modern mathematics and quantum logic. Thus, true reality obtained depends on how to create an ability to simulation of the cognition and cognitive processing. Cognition, described in meta language within the framework of quantum physics, not follow the scientific principles of classical physics. It is the Human thinking with quantum physics that has truly enlightened and opened the path that helps us understand a new quantum state of times described in meta language:

**Past-Present-Future,**

Which is neither past, nor present and nor future but a third option that transcends both. It's a realm where things are in potential state until they are observed, a photon of light, for example, pas in two places at the same time.

Quantum control focuses on using control to extract more information from quantum devices. Every important step in the operation of a quantum sensor can be enhanced by quantum control. It is the connection of human intelligence with quantum physics that has opened the path to quantum intelligence. In this article, we present research on a new informatics field of the Quantum Informatics, emphasizing to the potential combination: Quantum Physics, Cognitive Information Processing and Quantum computing, which allowing us to change the way disease is diagnosed, creating a powerful transformation in cybert security, in which, quantum entanglement principle allows us to assure that the message of sender and receiver has not been intercepted, in the quantum medicine, in the military and others. Different approach-

es related to above concepts and numerical examples of the human brain processing of cognition and quantum processing using quantum computer will be presented.

## Intuitive Perception

We recognize the real would base usually on our own cognition, in which knowledge can be true or false depending on the content of information available which we possess, rooted from binary philosophy, "It is impossible for something to be and not to be at the same time". Usually, we use visual perception derived from the human sensory system, eyes, ears, to perceive reality. In this case, any concept is described by common language, based on binary philosophy. Then measure an amount of information contained we use two alternative numbers, 1 or 0, two bits used in classical computers corresponding to classical physics. It is used today, called as AI, consequently, results obtained can only be true or false depending on the circumstances that apply. Digitization of information we use bit ('1 or 0'), and controled methods:

**Classical Mathematics and Physics**

In this case, NN computing used usually in intuitive intelligence is shown in the (Figure 1).

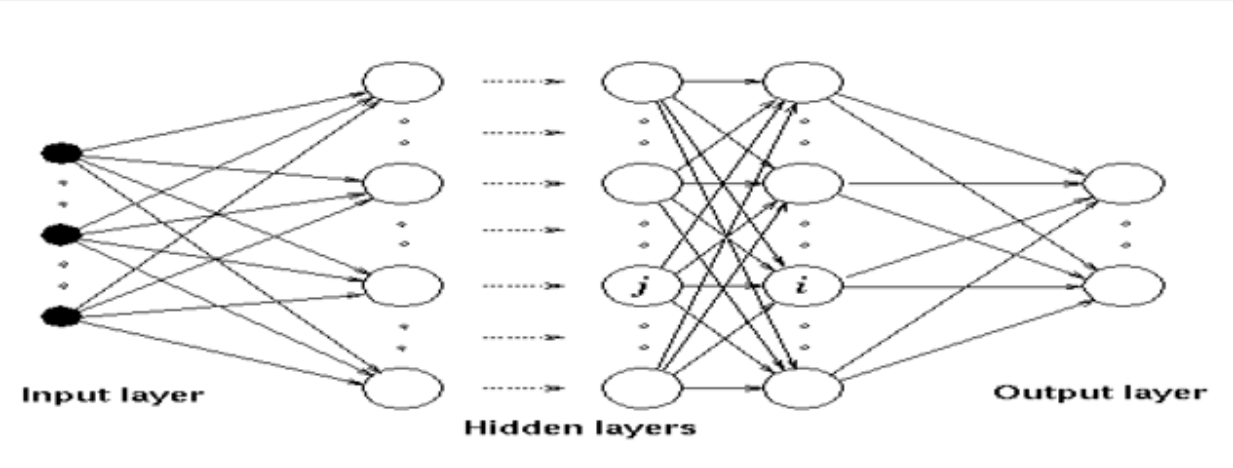


**Figure 1:** Typical AI model of NN computing.

A numerical example of **cognitive NN** computing is shown in the following.

## Counterintuitive Perception

The human intelligence depends on the counterintuitive perception, originated from the human brain, which we call higher Artificial Intelligence, used quantum bit, qubit |0ñ and |1ñ - superposition of two bits, described as spin of an electron in the interval [$0^o$, $90^o$]. It is the so called as the power of Latent Cognition, the latent power of consciousness and subconsciousness - the source of so-called infinite intelligence. In the real world, visual/intuitive perception is based on the principles of classical physics, however, perception originated from the human brain named couterintuitive perception does not follow the known laws of classical physics too but quantum physics/quantum mechanics. Counterintuitive perception was presented fistly by Zhang Zhi, Chinese philosopher 500 BC in his the "One" phylosophy, which describers not knowledge originated from logic (logical knowledge) but rather knowledge originated from a cognitive process in the human brain. The "One" philosophy presented by Zhuang Zhi Zhuang Zhou (369-286 BC), claimed that Discrimination, distinguish, and the opposition of it, Nondiscrimination, identify are seen as oneness,

**"Distinguish – Distinguish", Discrimination-Nondiscrimination,**

referred as a third option that transcends both Discrimination and Nondiscrimination. It represents authors' feeling comes from a cognitive processing process. Because author can't explain the meaning of his counterintuitive cognition by common language, Zhuang Zhi had to compose a parable, "Zhuang Zhi's dream". That is once Zhuang Zhi dreamed, he was a butterfly, a butterfly flitting and fluttering about, happy with himself and doing as he pleased. He didn't know that he was Zhuang Zhi. Suddenly he woke up and there he was, solid and unmistakable Zhuang Zhi. But he didn't know if he was Zhuang Zhi who had dreamt, he was a butterfly, or a butterfly dreaming that he was Zhuang Zhi. Between Zhuang Zhi and the butterfly there must be some distinction! This is called the Transformation of Things, **Zhuang Zhi-Butterfly**. It has successfully explained phenomena such as radiation and antimatter, the workings in the world of microscopic particles, and even other phenomena in the real world. While intuitive perception is referred as any property determined from actual information, expressed oneself in the framework of binary logic/intuitive logic as reality. Counterintuitive perception, individually being in the observer's mind, what we can't see in the real world and can't understand under the framework of classical physics. By definition,


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counterintuitive cognition is the superposition of two states of consciousness, but more importantly, what the consequences of its processing giving us from the real world. By other way, they are precisely the conscious development, that determines other levels of reality based on rather brain awareness, which is beyond the framework of pure matter. Graphically, through figures of Square and Hexagon in the states separated, **Square or Hexagon**, and superposition, **'Square-Hexagon'**, This hidden correlation is represented in this article through two capabilities of human logic and quantum information processing using quantum computer, based on quantum physics laws. It indicates an existence of relationship between the physical and mental worlds, a potential correlation of them. **Quantum-enhanced machine learning** refers to quantum intelligence that solve tasks in machine learning, thereby improving and often expediting classical machine learning techniques. Such algorithms typically require one to encode the given classical data set into a quantum computer to make it accessible for quantum information processing. Subsequently, quantum information processing routines are applied and the result of the quantum computation is read out by measuring the quantum system. It has put forward to counterintuitive cognition and cognitive superposition and cognitive entanglement. This hidden correlation is represented in this article through two capabilities of the human brain and quantum information processing using quantum computer.

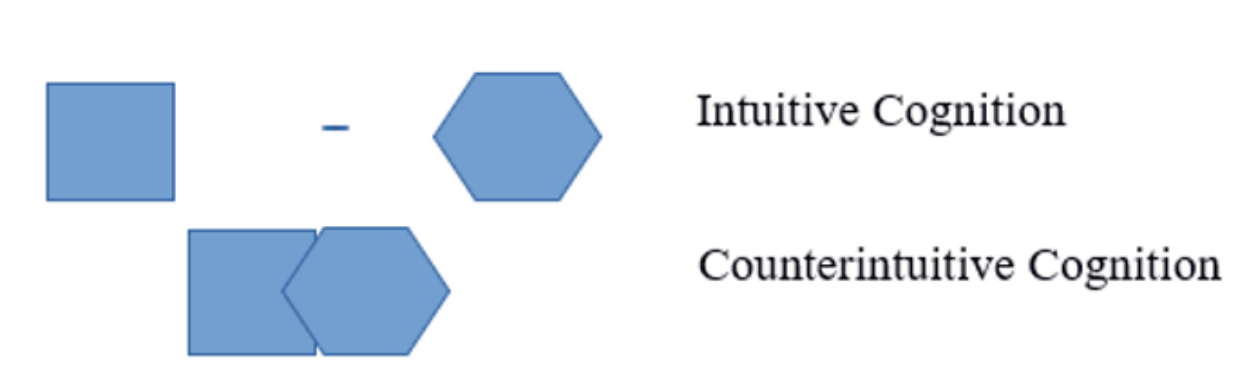


**Figure 2:** Two Intuitive Cognition and Counterintuitive Cognition.

It is fundamental of supernatural ability to perceive the past, present, and future as one, ***past-present-future*** through Deep Meditation (**YOGA**). Then, the intelligent level of quantum inteligence, QI depends not only on computational techniques, but more and even decisively, on the human thinking, in which, counterintuitive perception originated from the human brain is usually used to represent any idea of quantum information. It is described in Hilbert space by two vectors, |0ñ and |1ñ using:

**Modern Mathematics and Quantum Physics.**

It has revolutionized our understanding of physics and mechanics, and opened our eyes to new possibilities. It turns out that this counterintuitive perception is derived from the philosophy of mind, originated from the cognitive quantum field resulting directly from the neural network system activity of the human brain. It has created supernatural abilities to open up quantum philosophy of mind and quantum consciousness with potential power.

## Physical Superposition

It is the ability of a quantum system to be in multiple states simultaneously. for example, the flip of a coin, which consistently lands as 'heads' or 'tails'. However, when that coin is in mid-air, it is both heads and tails until it lands, heads and tails simultaneously. Thus, tossing a coin, predicting its landing state, "heads" or "tails" when the coin is in mid-air is impossible. Because, both "heads" and "tails" are equally likely to occur. It can be represented in the logic form, "heads Ù tails" or in meta language "heads-tails", which is neither head nor tail but a third option that transcendent both. It represents an ability of a quantum system to be in multiple states at the same time until it is measured.

## Physical Entanglement

Means that objects created together are entangled if separated they have the ability to communicate with each other and that communication is received immediately, with no regard to traditional space and time as we know it before, regardless of how far apart they may be. Entanglement is taking objects, connecting them by permanently entangling them together. It expresses entanglement relationship between waves passing through the slots a state that cannot be decomposed into its more fundamental parts. You can see later also, for example, when adding an additional qubit to a quantum computer, a 100-cubit quantum machine can examine $2^{100}$ states simultaneously. As, the extraordinary power of quantum algorithms seems to be derived from the properties of multi particles entangled states. In addition, the entanglement of qubits (quantum bit) allows quantum computers to solve problems efficiently, finding a solution faster, with many fewer calculations.


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Quantum physics is a promising field that intersects with medicine, for example, much more than originally understood. New scientific developments hold great promise for improving quality of care, clinical research, and the diagnosis and treatment of diseases. In terms of diagnosing different diseases, incorporating quantum mechanics into the study of medicine can allow for efficient diagnosis before symptoms even arise in a patient. Utilizing quantum theory in the field of medicine can help in understanding and applying treatments for a multitude of different diseases, such as Alzheimer's disease or diverse types of cancer, and even expand upon efficient and reliable diagnosis in clinical settings.

Let return to philosophy of Georg Wilhelm Friedrich Hegel 1770-1831, Brain Awareness, which is described as:

***we cannot have the pure being unless we also take into consideration nothing***

Here, superposition of two intuitive perceptions, being and nonbeing make up new concept, presented in the meta language,

'**Being-Nonbeing**',

which is neither **Being** nor **Nonbeing** but another option that includes both. It comes from human thinking based on so-called brain logic to describe many different states simultaneously in the form: Being-Nonbeing, **B-N, '1-0':**

$$\textbf{B-N} = \textbf{'1-0'} = \{10,\ 11,\ 01,\ 00\} \qquad (1)$$

Information traveling through the human brain at the speed of light takes on a new, counterintuitive form, measured in information units 01 (**0 AND 1**), rather than traditional information units, (**0 OR 1**), '1, 0'. Counterintuitive perception is originated from the actions of the human brain's neural network to quickly adapt to changes in in real time of real environmental conditions. It increases the power and intelligence level of the human brain.

In the framework of traditional informatics, each 'on-off' system stores bit: 'off' state = 0 and 'on' state = 1. Answer on the question 'Being OR Nobeing'? for example, intuitive perception, presented by:

$$\text{'Being OR Nonbeing'} = \{1, \square\} = \square^{\square} \text{ intuitive possibilities} \qquad (2)$$

In contrast, the counterintuitive perception presented by the meta concepts, 'Being AND Nonbeing' = **Being-Nonbeing** = **'1-0'** is individually being in the observer's spirit under the semantic and pragmatic aspects of them. They are precisely the conscious development - that determines other levels of reality, which is beyond the purely physical and deterministic, can be accessed. That is to say, inference based on Hegel's philosophy, being-nonbeing, is presented as:

$$\text{'}Being\ AND\ Nonbeing\text{'} = \{\neg BN, \neg B\neg N, BN, B\neg N\} = \square^{\square} \text{quantum possibilities} \qquad (3)$$

It indicates that, counterintuitive perceptions result in exponential growth ($\square^{\square}$) of possibilities. That is to say, meaning of the '**B**eing-**N**onbeing' concept known as quantum consciousness contains much more information than the information contained in the '**B**eing OR **N**onbeing' concept. Similarly, for three valued logics, each counterintuitive perception exists in three states simultaneously, B, N and X (both B and N), processing of 'Being-Nonbeing', is presented in the form:

$$\text{'}Being\ AND\ Nonbeing\text{'} = \{\neg BN\neg X, \neg BNX, \neg B\neg N\neg X, \neg B\neg NX, BN\neg X, BNX, B\neg N\neg X, B\neg NX\} = \square^{\square} \text{quantum possibilities} \qquad (4)$$

It is clear, that instead of recognizing being or non-being only, choosing between two possibilities by intuitive perception, while in observer's mind, many new ideas could be appeared. Then, intuitive perceptions are produced by the intercourse of the body senses with the objects, originated from the observer's physical perceptions, who can recognize quickly being or non-being by his/her eyes; the counterintuitive perceptions, 'being AND non-being' are individually being in the observer's spirit under the semantic and pragmatic aspects of them. They are precisely the conscious development that determines other levels of reality, which is beyond the purely physical and deterministic, can be accessed.

It is clear, that the meta-concept **Being-Nonbeing** ('being AND non-being') originated from the human **C**ognitive **P**rocessing is formulated from many cases recognizing by observers through his/her internal information processing (semantic-pragmatic analysis). It represents his/her qualitative evaluations of unavoidable superposition of information, e.g., the appearance of the same symptoms of many different diseases in medicine. They oblige us to introduce new notions ($2^n$ cases), n denotes a number of n-valued logic, into doctor's mind rather than result derived from his/her external information processing (syntax analysis for quantitative evaluations). Thus, from the disappearance of the weak cases due to consequence of syntax analysis we must overcome its limitations through semantic-pragmatic analysis to find out more of cases from the real world into the world of assumptions. Thus, the power of quantum perception changes depending on the number of logic values. That is, for n = 2, 3, …, n, we have: n = n Þ exponential growth $2^n$.

It indicates really that quantum logic decides the potential power of counterintuitive perception. It is the key to increase the remarkable power exponentially, $2^n$, of potential quantum intelligence.

## Quantum Computing

Intelligent control such as: feedback and feedforward control "Senor-actuator" control have been established and widely used. In contrast to classical control, techniques such as: quantum optimal control, quantum feedback control and others are used in quantum control methods, They focuses on using control to extract more – and more useful – information from quantum devices. In these methods, control fields are designed to maximizing entanglement or achieving desired quantum states in order to: Improve hardware performance. Classical control systems are governed by deterministic laws, while quantum control systems are governed


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by probabilistic laws. Quantum control aims how can systems that obey the laws of quantum mechanics be effectively controlled to produce desired behaviors? It guides researchers in gathering information about the dynamics of a system through measurements and provides useful performance in computing, sensing, and metrology. Every important step in the operation of a quantum sensor can be enhanced by quantum control Quantum computing is a field that combines the principles of quantum mechanics/physics with information theory to study the analysis, and transmission of information. It covers both theoretical and experimental aspects of quantum physics. It helps us to understand how the fundamental laws of physics can be exploited to radically improve the collection, transmission and processing of information. It turns out that the laws of quantum mechanics/physics can be exploited to perform very important and difficult information processing tasks, a promising new field of science and technology. Superposition is the ability of a system to be in multiple states simultaneously, which can be written as a superposition of eigenvalues, see Le Bellac M [1]. It allows quantum computers to increase computational speed exponentially in which, a new concept of quantum bit, **qubit**, used to information processing is concerned with spin of an electron under the physical nature, an ability to perform a large number of digital operations in quantum computer. Taking spin of electron as quantum bit, which is determined, according to quantum informatics by all of values in the interval [0, 1], contains a wealth of information that is incredibly closely related to the logical values of quantum logic. Superposition of 1 and 0, '**1-0**', see Chris Bernhardt [2], is really represented as the quantum bit, **qubit/spin** of an electron.

- Using traditional bits to describe information, we have:

$$\text{'Being OR Nonbeing'} = \{1 \vee 0\} = 2^1 \quad (5)$$

Let $x_2$ represents numbers in the binary counting system and $x_{10}$ described numbers in the decimal counting system. For example, 3, 5, in the decimal system can be write as: $3_{10}$ and $5_{10}$, which can be changed to number belonging in the binary system, $x_2$, as follows:

$$3_{10} = 011_2;\ 5_{10} = 101_2 \quad (6)$$

And, each number in the binary system $x_2$, e.g., $011_2$, $101_2$, can be changed to number belonging in the decimal system, $x_{10}$ as follows:

$$011_2 = 0 * 2^2 + 1 * 2^1 + 1 * 2^0 = 3_{10} \Rightarrow 011_2 = 3_{10} \quad (7)$$

$$101_2 = 1 * 2^2 + 0 * 2^1 + 1 * 2^0 = 5_{10} \Rightarrow 101_2 = 5_{10} \quad (8)$$

One of the following eight configurations for numbers from $0_{10}$ to $7_{10}$ can be stored in the classic register:

$$0_{10} = \{000_2\},\ 1_{10} = \{001_2\},\ 2_{10} = \{010_2\},\ 3_{10} = \{011_2\} \quad (9)$$

$$4_{10} = \{100_2\},\ 5_{10} = \{101_2\},\ 6_{10} = \{110_2\},\ 7_{10} = \{111_2\} \quad (10)$$

The triple system also allows us to store numbers from 0 to 7, for example eight states:

$$0_{10} = |000\rangle,\ 1_{10} = |001\rangle,\ 2_{10} = |010\rangle,\ 3_{10} = |011\rangle \quad (11)$$

$$4_{10} = |100\rangle,\ 5_{10} = |101\rangle,\ 6_{10} = |110\rangle,\ 7_{10} = |111\rangle \quad (12)$$

- Information processing using quantum bit, **qubit,** $|1\rangle$ and $|0\rangle$

Sign of the **tensor product**, $\otimes$, for example, $|101\rangle$ is abbreviated entry for the state $|1_A\rangle 0_B \otimes 1_C\rangle$, where, state vectors for qubits A, B, C belong accordingly to Hilbert spaces $H_A$, $H_B$ and $H_C$. Let $|x\rangle$, $x = 0, 1, \ldots, 7$, means one of eight states above, for example $5 = |101\rangle$. For n, denotes a qubit number and $0 \le x \le 2^n - 1$, orthonormal vector $|x\rangle$ creates a computational basis in space $H^{\otimes v}$ that is: for n qubits enable us to remember $2^n$ numbers in the computational basis, where, n denotes qubit number. The meaning of the tensor product, $\otimes$, is presented as follows. Two columns vectors $|u\rangle$ and $|v\rangle$ of lengths m and n yield a column vector of length m.n when tensored, shown in the following equations:

$$|u\rangle \otimes |v\rangle = \begin{bmatrix} u_0 \\ u_1 \\ \ldots \\ u_m \end{bmatrix} \otimes \begin{bmatrix} v_0 \\ v_1 \\ \ldots \\ v_n \end{bmatrix} = \begin{bmatrix} u_0.v_0 \\ u_0.v_1 \\ \ldots \\ u_0.v_n \\ u_1.v_0 \\ u_1.v_1 \\ \ldots \\ u_{m-1}.v_n \\ u_m.v_0 \\ \ldots \\ \ldots \\ u_m.v_n \end{bmatrix} \quad (13)$$

We use arrow, where its direction is corresponding to the direction of spin of an electron/photon to describe the quantum bit, **qubit** in the vector Hilbert space:

$$|1\rangle = \begin{bmatrix} 0 \\ 1 \end{bmatrix},\ |0\rangle = \begin{bmatrix} 1 \\ 0 \end{bmatrix} \quad (14)$$

All matter is composed of atoms, nuclei, electrons, the interactions and time evolution of atoms are governed by the laws of quantum mechanics/physics. Superconducting chips with 4–9 qubits have been demonstrated with the performance required to run quantum simulation algorithms, quantum machine learning according to D Deutsch [3] and others. A practical quantum instruction set architecture is presented by Robert S Smith, Michael J Curtis, William J Zeng [4], in which authors introduce an abstract machine architecture for classical/quantum computations including compilation along with a quantum instruction language for explicitly writing these computations.



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**For n = 2**, we have the physical state presented by,

$$|X_{00}\rangle = |0_A \otimes 0_B\rangle. \quad (15)$$

Let the first qubit, A belong to the Hilbert space $H_A$, with the orthonormal basis is $\{|0_A\rangle, |1_A\rangle\}$ a second qubit B to the Hilbert space $H_B$ with the orthonormal basis is $\{|0_B\rangle|1_B\rangle\}$. Let return to quantum perception processing, '**B-N**', with two qubits, in which, superposition of all possible states is represented by basis vector $|y\rangle$. Using bits (numbers in binary) to describe information for traditional computer, $1_2$ and $0_2$, gives the corresponding result:

$$\text{qubit} = \{00_2, 01_2, 10_2, 11_2\} \ (4 \text{ quantum possibilities}) = 2^2 \quad (16)$$

Using qubits for quantum computer gives the corresponding result.

$$\text{qubit} = |0\square\rangle, |\square\square\rangle, |1\square\rangle, |\square\square\rangle \quad (17)$$

Where, $|0\square\rangle$ is abbreviated entry for state $|0_A \otimes 0_B\rangle$ where state vector belongs respectively to spaces $H_A$, $H_B$. We have $2^2$ cognitive quantum states determined by:

$$|00\rangle = |0\rangle \otimes |0\rangle = \begin{bmatrix}1\\0\end{bmatrix} \otimes \begin{bmatrix}1\\0\end{bmatrix} \quad |01\rangle = |0\rangle \otimes |1\rangle = \begin{bmatrix}1\\0\end{bmatrix} \otimes \begin{bmatrix}0\\1\end{bmatrix} \quad (18)$$

$$|10\rangle = |1\rangle \otimes |0\rangle = \begin{bmatrix}0\\1\end{bmatrix} \otimes \begin{bmatrix}1\\0\end{bmatrix} \quad |11\rangle = |1\rangle \otimes |1\rangle = \begin{bmatrix}0\\1\end{bmatrix} \otimes \begin{bmatrix}0\\1\end{bmatrix} \quad (19)$$

We have basis vector for 2-qubits system

$$|\psi_2\rangle = \tau_\square |\square\square\rangle + \tau_\square |\square\square\rangle + \tau_\square |\square\square\rangle + \tau_\square |\square\square\rangle \quad (20)$$

Therefore, processing quantum information for 2 qubits gives us an **exponential power,** $2^2$.

**For n = 3**, we have the Power of three qubits. Similarly, is abbreviated entry for state $|0_A \otimes 0_B \otimes 0_C\square$ . This state vector belong respectively to spaces $H_A$, $H_B$, $H_C$. We have $2^3$ cognitive quantum states and basis vector for 3-qubits system (n = 3) and superposition and entanglement of 3 qubits is presented by **exponential power, $2^3$.**

$$|\psi_3\rangle = \tau_\square|\square\square\square\rangle + \tau_\square|\square\square\square\rangle + \tau_\square|\square\square\square\rangle + \tau_\square|\square\square\square\rangle + \tau_4|\square\square\square\rangle + \tau_5|\square\square\square\rangle + \tau_6|\square\square\square\rangle + \tau_7|\square\square\square\rangle \quad (21)$$

By similar way, we have: **for n-qubit processing: exponential power $2^n$**. (quantum power).

It generates greatly enhanced computing power to solve various practical problems. For example, **for n = 100, quantum machine can examine $2^{100}$ states simultaneously**.

As, the extraordinary power of quantum algorithms seems to be derived from the properties of multiparticle states. Superposition/Entanglement of qubits allows quantum computers to solve problems efficiently, finding a solution faster, with many fewer calculations.

A numerical example: We have the sample generates a single random byte,

qc.reset(n); // allocate some qubits qc.write(0); // write the value zero

qc.had(); // place them all into superposition of 0 and 1 var result = qc.read(); // read the result

as a digital bit qc.print('result: ' + result + '\n');qc.reset(n); // n = 1,2,3,..., allocate one qubit.

For n = 2, we have:


**Circle notation:**

**Program output:**

result: 0

result: 1

Thus, 2 qubit processing give us results equivalent to those obtained from quantum processing – '2-exponential' power, $2^2$.

**For n = 3**, using above program with n = 3 we have the corresponding program circuit:


**Circle notation**

**Program output**

result: 1 result: 1 result: 2

Thus, 3 qubit processing gives us results equivalent to those obtained from quantum perception processing – '3-exponential' power, $2^3$.

Similarly, for n = 4 we have results '4-exponential' power, $2^4$, etc. Thus, we have results equivalent to those obtained from quantum Perception processing 'n-exponential' power, $2^n$.

In fact, the counterintuitive perception, **being-nonbeing,** B-N, is really represented in the informatic form, '10' of qubit, they have identical 'n-exponential' power. This is the key to the exponential growth in computing power promised by qubits of quantum computer. One **qubit** alone can't provide the horsepower we really want out of quantum computers, so naturally we want to create a system that uses many, many more. The problem is once we have more than one **qubit** we're vastly increasing computing power, but we're also dealing with entanglement, wherein the qubits affect each other. Entanglement makes the measurement problem even more difficult since each qubit is affecting the superposition of the qubits around it.

## Quantum Teleportation

Generally, teleportation is the hypothetical transfer of matter or energy from one point to another without traversing the physical space between them. In quantum technology, it allows infor-



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mation to be transported between qubits, thereby bypassing the limitations. For example, Alice prepares her charge, then uses the HAD and CNOT operations to entangle the first qubit with the second qubit. Then, using the READ operation, she destroys both her charge and the entangled qubit. Circuit that performs teleportation of a qubit is presented in the following figure: (see Programming Quantum Computers, authors: Eric R Johnston [5])

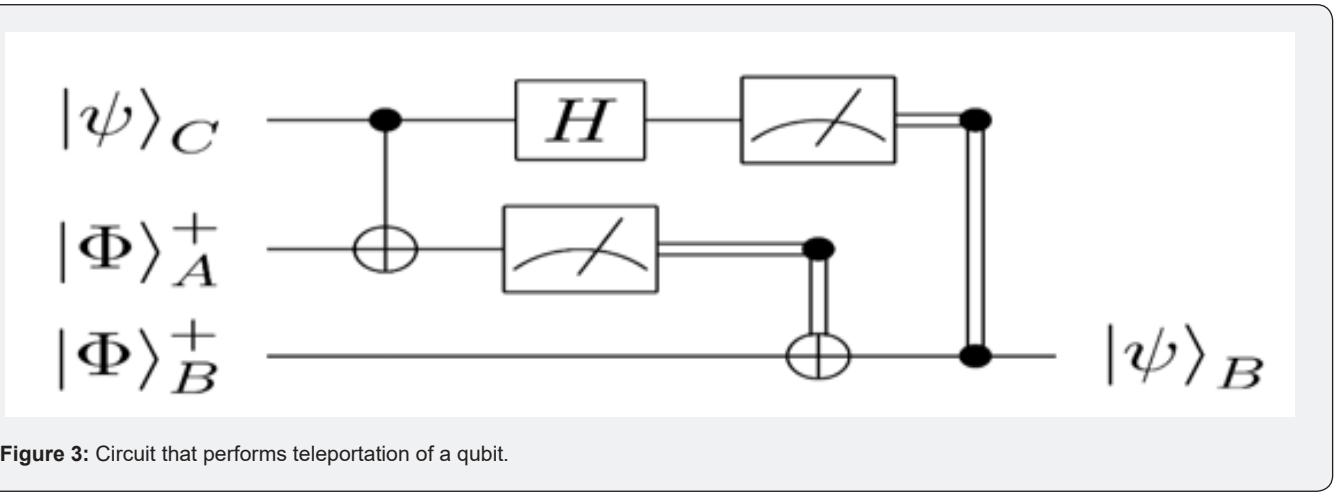



**Figure 3:** Circuit that performs teleportation of a qubit.

In principle, Quantum teleportation. is a process in which quantum information (the precise state of an atom or photon) can be transmitted from one location to another, using conventional communication and previously shared quantum entanglement between the sender and receiver. It is not a form of transportation but a form of communication: Quantum teleportation provides a way to transmit a qubit (quantum bit) from one location to another that is difficult to steal/not stolen [6].

For photons, these intermediate states correspond to different polarizations. The polarization of light (photons) plays an important role in quantum information communication instantaneous information transmission, **Alice** sends message and **Bob** receives message [7]. Teleportation allows information to be transported between qubits, thereby bypassing the limitations. It is actually using quantum mechanical message encryption through the Quantum Superposition Principle which helps **Alice** and **Bob** with the assurance that their messages are not intercepted/sniffed [8-10]. A example of Qubit Teleportation:

Step1: **Sender** and **Receiver** share qubits of an entangled state.

- **Receiver's** state intimately tied to result of **Sender's** measurement

Step 2: **Sender** measures her qubit

Step 3: **Sender** sends her measurement bits to **Receiver**

Step 4: **Receiver** applies a **single-qubit gate** to his qubit…

- chosen in accordance with **Sender's** measurement bits, **entanglement guarantees that Receiver has recovered the message** [11-12]**.**

A part of sample program demonstrates basic teleportation based on JavaScript language is presented bellows:

qc.reset(3); var sender = qint.new (1, 'sender'); var ep = qint.new (1, 'ep'); var receiver = qint.new(1, 'receiver'); var a1 = 0; var a2 = 0;

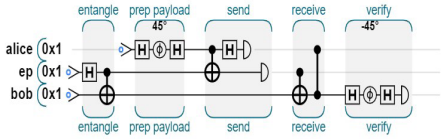
// This will work with entangle () and sender_prep () in either order.

// Try swapping them to verify this. Entangle (); sender_prep (); sender_send(); receiver_receive(); receiver_verify ();

function entangle ()

…… ……

**Program circuit**, in which, **alice** = sender; **bob** = receiver.




## Conclusion

Counterintuitive perception is originated from the human brain, described in the meta-language form, **being-nonbeing/being AND nonbeing**. It is individually being in the observer's spirit under the semantic-pragmatic aspects of the real world. Exploiting its content is beyond the limits of common language and classical computational methods. For quantum control, we need a new interdisciplinary approach, quantum informatics, including quantum physics, mathematics, informatics and computer science including quantum computer. It turns out that counterintuitive perception is precisely conscious development – a potential ability of the so-called psychic power of consciousness to determine higher levels of reality through the powerful ability of itself, increased at the exponential level ($2^n$), based on the quantum computer using quantum information described by quantum bit, qubit, "1-0". The combination of the power of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analytics and cognitive technology allows us to change the way disease is diagnosed, to create a powerful transformation in healthcare (quantum medicine). It could be applied to cyber and IoT security, quantum cryptography, to build the quantum cybersecurity software for digital government and others.

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