The Existence of Quantum Computer

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Abstract

We extend the empirically grounded theory of the existence of quantum computer. The main question that we are considering is a question about the possibility of existence and creation of quantum computer. As empirical evidence we use logic which we examine in cognitive perspective. For definition of the computer we use a formal definition of Turing machine. By formulating many definition abstract we go around the areas of quantum physics, quantum computing and other quantum-related fields of science which could give unambiguous answer for the question about the essence of quantum computer and which is developed so they can't. In many ways, it makes this theory about the existence of quantum computer universal for these areas, although less applied in them. We consider some corollary of the essences of quantum computer, including the refutation of possibility of the quantum computer for the human. The philosophical basis of the definition of human which we follow in our theory is scientific materialism.

1 Introduction

In light of improvement our knowledge in fields of quantum physics and popularization of computers, more and more often appear a question about the possibility of creation and existence of the quantum computer. Unambiguous answer for this question would be the fact of creation of such a device. However, without this fact, we have to be satisfied with hypotheses and theories about it.

The fact that question about the possibility of creation and existence of quantum computer could be solved theoretically should not contradict the fact of the practical solutions to this issue. In other words, practical implications of any theory is approved in so far as that theory approved in their proofs. Otherwise, in case of creation of the quantum computer before any theoretical foundation of its existence, we stay without possibility of any interaction with that object due to the inability to elementary determine the object of interaction.

In view of the fact that the branches of science that could be a clear answer to our question still developed, we have to resort to abstractions which can be ambiguous. At first glance, the abstract definitions are less conclusive and abstract theory less practical. This fair remark is true in the cases where the abstraction is considered out of their theories. At the same time, abstractions unambiguous while subject to certain laws while formed in profs that make up theres theories.

In our theory as such laws we use logic. This allows us to make substantive conclusions about things whose existence is purely hypothetical, given that the

laws of logic we are perceived objectively from there cognitive nature. Thus, the theory of the existence of quantum computer can be empirically justified without this kind of computer. It is unlikely and very controversial that flowerpot with tag "the quantum computer" find investment from Google.

Not less important subject that we are referring in the statements of our theory, namely the its absence, is a faith, which is unnecessary in any scientific theory. That's enough only one term of an theory for the definition of which is necessary to make an act of faith to completely destroy this theory. The act of faith, as a subjective act for the ascetic, in relation to only one term made the whole theory depends from the existence of that ascetic. This subjective knowledge deprived of the opportunity to be clearly transmitted and received between two humans. For us this mean that if someone can imagine the possibility of existence of quantum computer, but can not imagine it in a way to unambiguously capable of perception, such a representation is deprived of any meaning. The judgment of a relevant way for expression of this knowledge we entrust to the reader, this open for us opportunity to consider the act of existence or of creation objectively.

2 Computer

Let's start with the definition of computer.

Definition 2.1. Any machine is a computer, if

1. a range of tasks calculated by the machine is not definite;
2. a user is able to calculate any task by defining a calculation structure in therms of the computing machine (the computing terms);
3. the computing terms which operated by the machine and the user are constant.

Let's explain this definition.

By computing term, we mean any object which can represent the computation tasks (the task).

Case. Computing term could be an transistor which in the active state represent the calculation of the logical addition of 0 and 1. However, no matter how change the value of the computing term, computing term remains constant as a transistor.

By the constancy of computing term, we denote the property of each individual computing term be uniquely interpreted relative to the task at any moment of the calculation.

Case. If the transistor which is in an active state may be a result of the logical addition of 0 and 1 and may be not a result, such transistor we define as a broken transistor.

Remark. Here and below we use the term interpretation, but perhaps it would be appropriate to use the term verification. The term interpretation seems to us more general relativity to correlation between two objects. Because, the true result of the verification is not possible without the true result of the primary interpretation.

By the calculation structure, we mean the algorithm, and by the calculation — users interpretation of the task and the computing term.

Corollary 2.1. *Computing term is interpreted relativity to the task by defining calculation structure.*

Let's consider the concepts of the task and the solution.

By the task, we understand any statement represented in the words that have inner relation.

Case. The task of calculating the square of two is the statement: "the number 4 is related to the square of the two" Statement consists of the words, relation of which describe mathematics. At the same time, it is not an appropriate task: "the number 5 is related to the square of the two", because there is no relation between the words. It is not important for us what and how describe some relation. Determinative fact of definition the term "task" is a presence or absence of such relation.

By the a solution, correspondingly, — any task for which inner relation is interpreted by the user. Such a formal definition of the task and the solutions make them identical relatively to the calculation and to the calculation structure.

Intuitively, this can be formulate as follows: every solution is a task, but not every task is a solution.

Finally, by "not definite" property, we mean property of an object that describes the absence of an unambiguous definition of this object. Correspondingly, the range of tasks which is not definite is a rang unambiguous definition of which is absence.

We entrust the search for empirical base of the validity of given above definitions and their consequences to the reader, in view of the redundancy of this search for the question about the existence of quantum computer. By this, we only aim to prevent the unnecessary inflation of definitions that are more likely have been proven by a reader even without scientific representation of this base.

It will be true to said that the transistor does not a computing term and an as object called "a computing term" does not exist in nature which means that the theory built on such definitions is wrong. However, the objective perception of such a statement is extremely problematic, in view of the subjectivity of quotient existence of any object in nature. Any theory of the object turn out as a mistaken by any unmistakable theory about the same object. That claim scientific knowledge as a priori unmistakable.

Prove the consistency of the computer definition 2.1 by a process of elimination

Proposition 2.1. *Let there be given computer to which complied only conditions 1 and 2. Since the computing terms are not constant and computing terms represent a task, the ability to determine the calculation of the structure at some moment for the user is absent which contradict to given.*

Proposition 2.2. *Let there be given computer to which complied only conditions 2 and 3. Since the range of tasks is define and computing terms are constant, the ability calculation of any task for the user is absent which contradict to given.*

Proposition 2.3. *Let there be given computer to which complied only conditions 3 and 1. Since the user are not able to calculate any tasks and computing terms are constant, the range of the tasks is definite which contradict to given.*

Since all three proposition contradict to given, our definition of computer 2.1 is consistent.

3 Quantum Computer

Let's start with a definition of the quantum which we give as trivial generalization of any dictionary definition.

Definition 3.1. Quantum is any particle that stay at the same moment in opposite relation relativity to its context. Such a position of a particle we call a superposition.

Case. Schrödinger's cat is at the same time stay in opposite relation relativity to the existence of cats so this cat is in the superposition.

Correspondingly, for us the quantum computer is any computer computing terms of which are in a superposition.

Define the same, but more definitely.

Definition 3.2. Quantum computer is a machine if

1. for the machine is true three properties of the computer 2.1;
2. a computing terms of which are in a superposition.

To make the picture complete, we assume meaningless for definition 3.2 count of computing terms which in a superposition.

Case. Computing terms in a superposition is a qubits. However, this theory also valid for qutrit, ququadrit, etc.

Theorem 3.1. *The user define calculation structure of the task concurrently with the calculation of this tasks by the quantum computer.*

Prove this theorem.

Proof. Let there be given that user define calculation structure in machine computing terms while computing terms are in a superposition and machine is a computers under 2.1.

Since the position of computing terms in a superposition is a position of at the same moment position of opposite relation under 3.2 and computing term is interpreted relatively to the task under 2.1, then the computing terms position of at the same moment in opposite relation is also interpreted relatively to the task

Since the computing term are constant at any calculation moment under 2.1 and task is interpreted by the user, then computing terms in a superposition at any calculation moment is interpreted by the user also at any calculation moment.

Since the computing term is interpreted relativity to the task by defining calculation structure under corollary 2.1 and computing terms in a superposition is interpreted by the user at any calculation moment, then definition of the calculation structure by user happened also at any calculation moment. □

Intuitively, the result can be formulated as like that: for unambiguously definition of something in a superposition it follow being in superposition in other case there is no way to unambiguously define something, which defining as something in a superposition, as something in a superposition.

The question "Can a human be in a superposition?", to be and not to be at the same time, we leave outside the scope of given theory. However, as an answer to the question "Is Quantum Computer possible?" we have to unambiguously definite: yes or no. Machine in a superposition, which concurrently is and which is not at the same time, we have seen as a pure abstraction.

Let's formulate some corollaries of the theorem and look at them.

Corollary 3.1. *The user of quantum computer is in a superposition and the definition of the calculation structure is a calculation moment for the quantum computer.*

In many ways, the obvious consequence of the theorem 3.1. However, it leaves open the question "Is it possible to to set the task so in a superposition would be task and not the user?" In fact, the answer to this question is our theory about the existence of quantum computer and its own form. The literal answer: yes, it's possible. This problem would be the same abstraction as an quantum computer for the human, and the process of setting this problem — the theory about existents of this task.

Corollary 3.2. *The quantum computer is possible in the form of a quantum machine.*

We have built our theory on the definition of a computer which is an expanded definition of the machine. This allows the possibility for quantum machine for which complied two of the three conditions of the computer and computing terms of which are in a superposition. At least, theoretically.

Corollary 3.3. *The essence of quantum machine strictly determine the range of tasks available for solving on this machine.*

This corollary follows from the corollary 3.2. It seems improbable, for the human the existence of machine which work and contradict to 2 and 3 properties of the computer definition 2.1. By process of elimination we can conclude that the quantum machine can only calculate strictly specific rang of tasks. It is likely that the calculation structure of such machine is the result of the design solutions of this machine. For the rest, such applied questions are beyond the scope of this theory.

Corollary 3.4. *The existence of quantum computer is excluded for a human.*

This corollary is possible, because we take the view that human as a scientific object is material object. Since the object acquires the properties of matter in the context of unambiguously to something, then absurd in the definition of this object is excluded. Accordingly, from the perspective of the scientific approach, the existence of quantum computer as is excluded for the human.

Corollary 3.5. *Only the quantum computer can communicate with another quantum computer.*

In other words, if a human caught in a space where quantum computer exist, that human also will have no opportunity to interact with it as if it materialized out of thin air by magic. This corollary removes the possibility of the existence of a certain interface or any other scalable possibilities between the human and the quantum computer.

It is possible the following hypothesis against this corollary: it could possible that the human already has the quantum computer so that the quantum computer as a machine is redundant so if we build a quantum machine and connect it to the human, we get the same quantum computer which have scalable possibilities and which is an interface with other quantum computer. For example, the human brain may be represented as such object.

However, even if we have a quantum machine and can connect it with the brain, we also have to define a quantum computer that would define something connected as the quantum computer. Let's say that science has researched all about the human brain as a quantum computer and can determine what is the quantum computer. Due to the superposition nature of some parts of such machine, an opportunity for the human to establish a unambiguously interaction and not find themself in a superposition is missing from 3.1. We can assume that if the brain is indeed the quantum computer under 3.2 to determine this it would have to research a quantum computer to research which is required research the brain. Such a situation can not fail inspire the scientists involved in similar researches.

4 Work with references

One of the key definition in our theory is the determination of computing and the definitions of the task, the solution and the algorithm, which related with it. We define these adjectives as nomenclature and use formal. That is different from the popular practice in the areas of science where such terms used as a subject and could be developed. For example, in the theory of numbers or in the theory of games. Such approach has been expressly formulated by the works of the great mathematician Bourbaki.

We refer to his work "Theory of Sets" in all matters relating to the formal definitions of computation process. In effect, what we define as "a task" that Bourbaki define as "a proof" [1, Introduction, p. 7] and as such "a statement" - as "a mathematical theory" [1, Chapter 1, p. 16]. Correspondingly, we assume all possible fullness of implication from this fact.

Equally important definition is the computer, and more specifically the computing term. In this, we refer to the work of Alan Turing. Turing machine is described quite elementary and at the same time high-grade that would give us an universal definition of the computer. Formally, we use as definition of "a computing term" that what Turing called "scanned square". [5, Computing machines, p. 231]

In definition the quantum and the superposition, as mentioned above, we use the dictionary definition which we formulate as abstract as possible. That level of abstraction allows us to use the definition, for example from Wikipedia [6], without fear that this definition will change in due to development in physics and in quantum-related fields of science.

Finally, since we are using logic as a representation of empirical experience, it

should be mentioned about the researches that postulate of logic from cognitive side. As these, we use the works of Giacomo Rizzolatt "Mirrors in the brain: How our minds share actions and emotions" [4] and George Lakoff "Women, fire, and dangerous things: What categories reveal about the mind" [2].

The first book presents the results of research of mirror neuron which we use when affirm the material basis of the logical experience. In the second book contain more general conclusions about the cognitive perception of the human as well some application examples of their in the field of science, linguistics.

All of this allows us affirm that our theory of the existence of quantum computer is empirically based and free from speculation.

5 Conclusion

One argument against the telepathy, that has been suggested by Stanislaw Lem [3, Chapter 8. A Lampoon of Evolution. Extrasensory Phenomena], is "evolutionary". In few words, it goes like this: the number of people, which have been experienced "telepathic phenomenon", is close to zero in comparison with the number of "experiments" which have been conducted by a natural evolution during the existence of the species over billions of years, and if it failed to "accumulate" signs of telepathy, it means — there was nothing to accumulate.

We can safely assume that the creation of quantum computer solve many problems of humanity at once, if not solve them at all. Starting from the creation of a completely open society, which appeared as built without cryptography, ending with the creation of artificial intelligence, which knows every answer before any question.

Keeping in mind these prospects, we might ask: if such a possibility would be actually exists, would be a human to do science, society, art, etc.? If it would be actually exists, even in the form of a weak-weak, very dull hypothesis, some possibility to solve all the problems of humanity at once and by one object would not human use it?

If that happened, the whole evolution of humanity would be reduced to the use of such opportunity so that everyone could not have been unaware of such object. However, it is very difficult to find evidence for it, even if it actually possible. The statement that Einstein created "The theory of relativity" with some preconceptions about the way of using it is extremely speculative. Perhaps, it was no less speculative even for Einstein. What for, in principle, someone may need "The theory of some relativity", especially when this theory doesn't exist?!

Counterargument for this could be a statement that everything still is in the future and humanity are only now evolved enough for make the question about quantum computer. However, this argument should be used very carefully. The statement that human evolved enough for something implicitly assumes that each human is an exact copy of itself to affirm a general relation towards to something. This assertion seems unscientific. Even replacing the word "human" to "humanity" does not change the thing.

We can't say also that research in the field of quantum physics, in quantum computation and the other areas related to the quantum computer will be useless. Research in cognitive sciences allow us to say that everyone view at the world in the same way, but the visible world is unique according to the personal experience of perception. The human could find useful any knowledge

that science develops. It allows us to look into the future with great optimism, even without the quantum computer.

References

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