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Thoughts concerning artificial intelligence & machine learning

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Abstract
THOUGHTS ABOUT ARTIFICIAL INTELLIGENCE, MACHINE LEARNING
Artificial intelligence and machine learning are nowadays one of the daily tasks of digital technology developers. Almost daily, we hear more and more miracles performed by robots, and about computer programs that solve previously impossible-looking problems. Is there a theoretical foundation at all, do we know whether machines can think? The question is exciting and still open. The study introduces the Readers to the arguments and debates of this issue.

Keywords
artificial intelligence, machine learning, mathematics, informatics

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'They say, do the impossible!'
'If you tell me what's impossible, I'll do it.'
(Peter Gyarmati)

We are living in an era of all-encompassing importance and development of machine learning, artificial intelligence (AI). There is a huge competition in economic life for the market share of assets made from the AI results, perfectly justifying John Neumann's[1] former statement that "there is no cure for development". To understand this huge interest now, it is worth looking back at the not-too-distant past that laid the foundation for our knowledge today.

Can machines think the question has arisen as computers and their peers engage in activities that a person performs with their brains? "A machine can process information, calculate, infer, and answer: perform rational operations on information. So the machine can think[2]. "

The question, or the statement, provoked a highly heated, in many cases extreme, overheated, passionate debate at the time. This is understandable, as the issue also touches on deep-rooted emotional and religious beliefs. The other extreme position vis-à-vis Berkeley represented by the Church: the machine in principle, cannot think because thinking is a property of the soul that is of divine origin. Again, others have argued that machines are incapable of thinking because thinking is essentially tied to living matter, like the brain, but machines are made of dead matter. The issue has also prompted professionals to conduct in-depth investigations. In the course of these, it soon became clear that to answer the question, it was first necessary to examine, not only in general but also specifically, what the concept of 'thinking' actually means. Already in the motto, there was a lack of exactness, which always stems from some conceptual area.

Obviously, different answers can be given to the question raised, depending based on what society, from what point of view, and even what kind of basic-skilled professional is trying to formulate the answer. Physiologists, provided they dealt with the issue at all, came to a somewhat reluctant, cautious stance. Stanley Cobb[3], an English physiologist, writes, "The brain is an organ of consciousness. In man, the incredible complexity of the brain is what makes thinking possible, but any in-depth study of the anatomy and physiology of the brain cannot explain consciousness on its own. Thinking is a series of events that depend on the interaction of information generated in some parts of the brain by external stimuli and from other brain parts. ' This definition is interesting because it perceives thinking as a realistic — that is, material — sequence of events that occur in response to stimuli from the outside world. On the other hand, it is inherently resignable because of the complexity of the logical structure of the brain.

As early as 1936, the English mathematician A.M. Turing[4] showed that any number (for example, the solution of a mathematical problem) for which a so-called *effective method* (finite number of rules; algorithm nowadays) can be given can be calculated using a (then even hypothetical) automaton. Such an automaton has since called the Turing machine.

Concerning the computer[5], W. S. McCulloch (physiologist) and W. Pitts (mathematician)[6] formulated the same theorem in such a way that any procedure - expressed fully and unambiguously in words - can be accomplished with a suitable combination of a finite number of universal switching elements. Such is the case with living neurons, they claim.

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[1] "There is no cure for development" J. von Neumann: Collected works. Pergamon-Press 1963.
[2] E.C.Berkeley: Giant brains or Machines that think. Wiley; First Edition (1949).
[3] S. Cobb physiologist, England.
[4] A. Turing: The computer and the brain. MIND, 1950.
[5] P.G.Gyarmati: A contribution to the Hungarian computer history, 1958-1968.
[6] W. S. McCulloch, W. Pitts, "A logical calculus of the ideas immanent in neurons activity", Bull. Math. Biophysics, vol. 5, pp. 115-133, 1943.

From this, however, John von Neumann drew the important conclusion that, within the current technical limitations, computers can be programmed to perform all operations that can be included in clear rules. Everything that can be expressed verbally or with verbal questions can also be realized!
A. M. Turing, putting aside all emotional and religious motives, based on an inventory of all the relevant circumstances, came to the following conclusion: a machine can be said to ‘think’ if, under clearly defined experimental conditions, any human question can be answered in such a way that the questioner concludes that the answer is of human origin. According to this, the definition of thinking is operative, that is, equivalent to the behavior observed from outside.
The correct question, then, is not whether machines can think, rather, what transactions can be programmed on the machine. To what extent can a given machine think? By 1962, we had already solved logical problems with computers and proved mathematical theorems[7]. They thought that by the end of the century we would be free to talk about machine thinking without provoking any contradiction, despite the large number of counter-opinions.
You may want to review these and consider them below:
1. Theological objection. Thinking is a function of the human soul, given by God, but not given to any other animal or machine.
A counter-argument, on the other hand, is that according to the Old Testament, certain animals also have souls. The soul only needs to have a proper brain, which is just a matter of mutation. Then there is the fact that, according to the Mohammedan view, women have no soul. Finally, theological arguments can only live on until sufficient scientific knowledge is available to us.
2. Ostrich policy. The consequences of thinking machines are unpredictable hopefully this will not happen. The reason is the feeling of human superiority or the fear of losing it.
The reality is that business relationships do not care about anything with any fears or consequences, the development cannot be stopped.
3. Mathematical objection. There are limitations to the performance of discrete-state machines. According to the Gödel theorem[8], any sufficiently powerful logic system can make statements that cannot be refuted or proved within the system, unless the system itself contains a contradiction. The consequence is that the logic machine's response will be incorrect or non-responsive at all.
A counterargument although the human element is always able to respond, it is how many of them are at fault. Obviously, some people are smarter than a particular machine, but obviously, there may be machines that are smarter than he is and so on.
4. Self-awareness. As long as a machine cannot write a sonnet or a concert based on perceived thoughts, but purely by results of random arrangement of symbols, we cannot agree that a machine is equivalent to a brain that not only writes but also knows that it has written. No mechanism can take pleasure in its success (artificial indication would be a cheap idea).
Obviously, there are different levels of limitations, just as there are for humans. If A thinks, “A thinks and B doesn’t,” and if B thinks, “B thinks and A doesn’t,” and they argue about it, then we can only assume that everyone thinks — otherwise there could be no debate. It is not about someone or something perform a text parrot-like.
5. Lack of skills. It is possible that you can do a machine that does all of the given things, but you never know that it could do any X things. Here, under X, many qualities could be mentioned, for example, the machine should be kind, helpful, beautiful, friendly, have a sense of humor, love creamy strawberries, awaken love, etc.
Indeed, most of our machines are ugly, just right for the purpose, unable to react to changes in purpose, etc... Miniaturization, nanotechnology, the discovery of new materials have made it possible to develop high capacity and fast devices that are already quite independent of appearance, Even they could be nice. They have enough memory, able to remember, learn, and even have significantly greater capacity and speed than the human brain; what’s more, they work accurately and reliably. We

[7] Computer and Automation, 1962. 9.
[8] Gödel, Autriche mathematician. The philosophy of mathematics entering the 21. Century. Collected works 2013. p.61.

can see that there are no boundaries, only the results achieved are incomplete. There are many possibilities and still plenty to do.

6. Right to make a mistake. Machines, by their very nature, are infallible. If that were not the case, we would not be using them. Of course, this is not about the malfunction.

Why is this wrong? Theoretically, these are variants of solutions with different values. Such as correct, less correct, satisfactory, in some sense bad, incorrect. Starting with the ability of machine learning, we can conclude that the machine may also come to different conclusions, just as men may make mistakes because the things learned come from a different environment than their application.

7. Lady Lovelace[9] brought up: Machines cannot initiate, cannot create new things.

The objection was, first, that the statement could only relate to the observed assets at its disposal. Secondly, the question is; can a machine cause a surprise, that is, do something we did not expect? Obviously, it can! For example, when it turns out that some of my assumptions, my calculations were incorrect because the machine came up with a different result or already knows and reports from its database that the theater ticket has run out but can get one for the next performance. This is based on an always up-to-date database - from there everyone buys tickets. So the machine knows what we do not, the machine can speak if there will be a performance that interests us.

8. The contradiction of the continuous and discrete. Man is constantly affected by and responds to environmental influences. By the discrete way, there will be drops in response.

Discoveries in neurology since this inception has demonstrated the discrete functioning of the brain. Where necessary, the nerves can maintain their signal continuously. The machines are also perfectly suited for this: the control and the regulation is discreet, the intervention is continuous. Almost every cybernetic system is built in this way.

9. Unbinding of behavior. Is it possible to create a set of rules that would describe to man, to society, what to do in any case, how to behave? If that were the case, man would be a machine, though man cannot be a machine!

The counter-argument is that nature, the laws of nature, regulate us completely, since we are part of it, yet we do not consider ourselves machines. We know, however, that our politicians, ordering lawyers and others, working hard to “formulate” all sorts of rules as fully as possible. An everyday term is “zero tolerance”. Fortunately, this has not been the case so far, and they think the power is the right method, for which they have many miracle machines: military tools and methods.

10. Perception beyond the senses. The phenomena of telepathy thought reading, foresight, and the transmission of the will disturb even our scientific perception, so we do not want to make a machine for such a purpose.

Another application of perception is the creation of networks. On a very wide scale, we can get answers to our questions today that are beyond the capacity of our senses. Only the bugaboos and ghosts are missing from there, maybe the next generation still will be able to produce and display them on the World Wide Web.

11. Natural way. It took nature a few million years to create human intelligence. How long does it take man to complete artificial intelligence up to the level of human intelligence, given the accelerated scientific and technical progress and achievements? Will he be able to do this at all?

Nature has solved this task with diversity, mutation, and significant environmental changes. Living creatures reproduce, respond to their environment, and have an energy cycle. Imitation of the living requires at least the artificial realization of these factors.

Individuals learn from their relationship with the environment and each other, and certain parts of it inherited during reproduction, as well as further developed and changed through mutation. What is “conscious” —intentional — from these we call development. The other changes are random and create diversity. This definition may not be accurate about understand tribal development. Nevertheless, we know that the environmental experience and mutation build on each other creates it, and besides the human brain is a glaring case. To the best of our knowledge today, this is our ability

[9] Lady Lovelace: first machine programmer. Worked on the Babbage analytical machine.

given by nature, which is created through knowledge, intelligence, inheritance, experience, and learning. Therefore, intelligence is a process that develops in every human being throughout his/her life!

However, there is a small flaw in this reasoning, namely the part of intelligence that is "built into" the brain during inheritance. This is partly explained by the further inheritance of knowledge acquired by ancestors, but the first such inheritance, or ability, is already debatable. Is it God, or some creative origin, perhaps a game of nature, or a coincidence? Man created Frankenstein[10] and other companions, but they always felt the need, the addition of a "life-giving spark," without which a soulless, dead thing would remain. Modern literature also goes so far as to make any artificial intelligence feasible, but that, without man, remains completely meaningless.

Rather, they indicate the danger of a high degree of artificial intelligence, when machines become dominant and turn against man. This is an obvious assumption, as people are also constantly turning against each other. Such duality exists in our world for ages, on the one hand, we create devices with certain intelligence, and on the other hand - we entrust it with laws, rules, regulations, that is, we subordinate ourselves to the "sovereignty" of these devices. For example, when the car's engine is running, the onboard control computer closes the doors for some thoughtful protection. It will not open that on any request, it will only act following the provisions of its program. An even more serious example is the widespread view that we need to learn fewer and fewer things because, if necessary, the "machine knows" it and is always at our disposal. This can be appropriate as long as the machine is the doer and does it safely and always correctly. However, is it really can it be every time? Because if not, who will notice and change it? Another machine? After all, "knowledge" is in the machine!

Despite the objections, so we can state that machines are capable of thinking, suitable for things and behaviors that have been attributed only to man up until now. We also know that this is not one piece of a complete machine, also the man is not just one, but a whole society. We have also learned that just as a man not infallible, so is not the machine, unless it is our express intention, as we expect from automatic machines. The machine also always learns and applies the experiments in a given environment.

This statement raises new questions! Is thinking really the result of the intricate interplay of many kinds of algorithms? On the other hand, is there a certain "qualitative leap" that separates, as it does, between the living creatures and the lifeless, according to the best of our knowledge?

The answer to these questions is open, but this should not hinder the overriding intention of the human world to develop. In this, case the ever-increasing development of machine learning, artificial intelligence, robotics, anthropomorphic devices, etc.

We are constantly looking for the answer and we have some solutions. In a study, John Neumann writes,[11] "The human intellect has many qualities that cannot be approached automatically. This type of logic, commonly referred to as "intuitive," is something that we do not even have a normal description. The best and most we can do is to divide all the processes into ones that are machines and ones that people can do, and then we figure out ways to connect the two". Even today, we think this is the way of development: we have a goal, we have a task, the final solution may not be possible, but not necessary.

The birth of the idea of the thinking machine immediately gave hope to the mechanization dream of intelligence. The first artificial intelligence congress[12] held in Dartmouth[13] in 1956 and the first

[10] Mary Shelley: Frankenstein, the modern Prometheus. Cosmos Fantastic Books.

[11] The effects of the newest scientific results to the Economics. 1956. Looking Ahead, No.4. p.11.

[12] J. McCarthy, M. Minsky, N. Rochester, C. Shannon (1955): "A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence".

[13] http://www.formal.stanford.edu/jmc/history/dartmouth/dartmouth.html. Retrieved 30. August 2007.

version of the LISP[14] completed as early as 1958. Hope soon dissipated, it turned out that any description of human reasoning becomes mere logic, and even at the moment it begins to operate on a machine, it becomes an algorithm, so no intelligence anymore. The algorithm is not intelligence, but a state sequence or rekurzor, as can be read extensively in the computer science literature. A typical example is the perceptron[15], which is merely an approximation of the neuron to an artificial model, far from a proven definition. However, there is no reason to despair, as the result - the perceptron model and its variants - is a well-applied tool in many areas: recognition and search algorithms, and so on.

Character-, speech-, language-, image recognition were the tasks of the beginnings, which with more or fewer pitfalls, still seem to be a task today. There have also been many achievements in artificial intelligence technology, primarily in the field of cognitive sciences, through expert systems, statistical theories ranging from robotics, data mining, automation issues, to human-machine relationships, and talking/speech recognition miracles.

The question of machine thinking is not dormant; at most, it appears in other, newer forms: perhaps there is not only one path – humanlike way – lead to intelligence, say the latest thoughts.

I am confident that the field of artificial intelligence is always renewed[16], able to meet new challenges and translate useful results into useful things. At the same time, keep in mind the dangers that humans can incorporate into their machines, or intervene intentionally or unintentionally, most of the time based on some interest and without any human responsibility. Besides the scientists nowadays, the technicians - the programmer, the builder, and applier of artificial intelligence - also have a huge responsibility.

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[14] Declarative programing languages: LISP, ERLANG, PROLOG, SQL, in certain way also the HTML and companies. These are according to the logic of AI. (The other types are the imperative - command given like - languages, which are the nature of the computer.

[15] P.G.Gyarmati: Some words about networks, ch.17. Perceptron pp.117-122. TCC COMPUTER STUDIO, 2011.

[16] S. J. Russell, P. Norvig (2003): Artificial Intelligence: A Modern Approach (second ed.), Upper Saddle River, New Jersey: Prentice Hall.