

Thinking Machines



Art by Google's DeepDream

By CMCL

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INTRODUCTION

Thinking Machines has the purpose of convincing the reader that machines are thinking, and that they are capable of reaching consciousness. It's not science fiction it's reality that has yet to unfold, and it's only when we think of it from this point of view that we concern ourselves with the implication that AI will bring to the way of life.

I

THE PROBABILITIES OF THINKING

“Just because someone or something thinks differently than you do, it doesn’t mean that it’s not thinking.”, A.M. Turing

“We are unlikely to someday have robots that decide to turn on us, defeat us, make us their slaves, or exterminate us; and just as unlikely to have them befriend us or show us love without being specifically prompted by instructions to do so. This is because such intentional behavior from an A.I. would undoubtedly require a mind, as intentionality can only arise when something possesses its own beliefs, desires, and motivations.”^[2], one with little experience or faith in machines would argue.

What is a “*mind*”? Merriam-Webster dictionary defines it as, “the element or complex of elements in an individual that feels, perceives, thinks, wills, and especially reasons”, a definition composed of words which have a almost endless amount of interpretation, words like “feelings”, “thoughts” and “will”.

Is the mind limited to us? Can we not adapt machines to think as we do therefore giving them our mind? Sure, at the moment we lack the understanding of the very thing we are. Yet, we hold on tight to our theories as if they were the truth. With those very theories we give machines systems modeled after our minds, and still we say they can’t think. What is it that limits thinking to us, is it perhaps that we’re living?

We live by our will, and our will, in most cases, drives our intent. So how can a machine have a will much more a intent? After all, aren’t those all human aspects that require a consciousness to achieve such a feat? Well, like many of us, our intent is discovery and understanding of all that surrounds us, and that’s just about what machines are being trained to do.

I I TRAINING MACHINES

As I've mentioned before we've reached a point in which we don't program every action a machine takes, but instead we "train" them. The field of machine learning has barely started, and yet our algorithms, which we'd have to manually tinker with before, have evolved into something like that of our own neural networks which form our mind. Machines capable of automating decision making, and much more impressive able to "think" of why and why not a decision is most appropriate.

Machine learning is a vast and ever growing field which started around the 1950. Today, companies worth billions like Google, Microsoft and Facebook have dedicated teams to the research and development of the field. In the past few years astonishing feats have been accomplished from Siri, a personal assistant reachable from your phone, to AlphaGo, beating top human players in the game of Go which has 2.08×10^{170} moves a feat ahead of its time by decades.

Siri and AlphaGo are two AI's that are worlds apart, both serving a different function. Yet they are one in the same as they're both "thinking machines", and their AI would be classified as weak or narrow. For even when they accomplish feats centuries ahead of predictions they are still simple compared to a strong or general AI. There are major differences between a weak/narrow and strong/general AI, but nevertheless they are both thinking machines.

Weak/Narrow AI, according to the Techopedia dictionary, is a form of AI specifically designed to be focused on a narrow task and seem very intelligent at it. Has never been viewed as general intelligence, but rather a construct designed to be intelligent in the narrow task that it is assigned to. Techopedia gave a very good example of a weak AI that being Apple's Siri, which has the Internet behind it serving as a powerful database. Siri seems very intelligent, as it is able to hold a conversation with actual people, even giving snide remarks and a few jokes, but actually operates in a very narrow, predefined manner. However, the "narrowness" of its function can be evidenced by its inaccurate results when it is engaged in conversations that it is not programmed to respond to.

Strong/General AI, is a form of AI designed with general intelligence allowing the machine to successfully perform any intellectual task that a human being can do,

such as: reason, strategy, puzzle solving, judgment, plan, learn, communicate and integrate everything into a common goal.

Just as you and I were educated AIs are also educated, while we have different types of schools(e.g. public, private and homeschool). AIs have different education system with different traits, benefits and disadvantages. Schools are the same as Systems are to AIs, they both share the common while different methods of educating they all educate.

Supervised Learning, the algorithm is taught or trained from data which is already labeled with the correct answer. The larger the data set the more the algorithm will be able to generalize in a more precise way. Once the training is completed, new data is provided, without the correct response labels, and the learning algorithm uses the past experience acquired during the training stage to predict a result.^[4]

Unsupervised Learning, the algorithm is trained using a data set that has no label; in this case, the algorithm is never told what the data represents. The idea is that the algorithm can find by itself only patterns that help to understand the data set.^[4]

Reinforced Learning, the algorithm learns by observing the world around it. Your input information is the feedback or feedback you get from the outside world in response to your actions. Therefore, the system learns based on trial and error. A good example of this type of learning can be found in games, where we try new strategies and we select and perfect those that help us win the game. As we gain more practice, the cumulative effect of reinforcement on our victorious actions will end up creating a winning strategy.^[4]

Deep Learning, is a particular set of machine learning algorithms that use deep structures of neural networks to find patterns in the data. These types of algorithms currently have a great interest, since they have proven to be extremely successful in solving certain types of problems; as for example, the recognition of images. Many consider that these types of models are those that in the future will lead us to solve definitively the problem of Artificial Intelligence.^[4]

Those are but four of the many methods used to teach machines today, and the field of machine learning is ever growing. It's without a doubt in my mind that reaching the pinnacle of weak and strong AI is only a matter of time, and when such a event occurs we'll need to have machine ethics on par; but what is a weak/strong AI?

WHAT IS INTELLIGENCE?

“Intelligence, by its very nature is something that cannot be understood but not because understanding it is impossible but because understanding it destroys our perception of it as intelligence.”, does this mean that when we understand how the human mind work we stop becoming intelligent? If not then what of machines when we give them our thinking process, are they not intelligent because we know their thinking process? As A.M. Turing said, “It doesn't matter how it works - if it behaves like a human intelligence then it is a human intelligence.” [\[3\]](#)

We can mimic the way we come to think be it the process or structure, then apply it in a way that machines think alike. Projecting our train of thought onto machines just as a monkey can mimic our actions by observing. Of course there is a fine line from mimicing and acting accordingly. But if the mokey knows to act a certain way from mimicing then he ahs learned.

The neural networks that we have today are but a theory on how our own neural networks work. For we have yet to understand how are our neural network works. There are two standing theories on how our nerual networks work the ___ and ___. The firts one theorises that our nerals are big little machines capable of holding and calcuatinoi a immense amout of data allowing us to funciton as we do. The seond theory is that our neurals, of which we have ___, are capable of holding and calculating a finite amout of data and it's only when they work together that we are able to function as we do; the nerual networks we use in machine leanring today are models after them.

“All digital computers are binary systems. This means that they store and process information exclusively in terms of two states, which are represented by different symbols—in this case 1s and 0s. It is an interesting fact of nature that binary digits can be used to represent most things; like numbers, letters, colors, shapes, images, and even audio with near perfect accuracy.

This two-symbol system is the foundational principle that all of digital computing is based upon. Everything a computer does involves manipulating two symbols in some way. As such, they can be thought of as a practical type of Turing machine—an abstract, hypothetical machine that computes by manipulating symbols.

A Turing machine's operations are said to be “syntactical”, meaning they only recognize symbols and not the meaning of those symbols—i.e., their semantics. Even the word “recognize” is misleading because it implies a subjective experience, so

perhaps it is better to simply say that computers are sensitive to symbols, whereas the brain is capable of semantic understanding." (Bobby Azarian, 31-Mar-2016, "A neuroscientist explains why artificially intelligent robots will never have consciousness like human")

If the material we are using at the moment limits our capability to create weak and strong AI then we must evolve into other fields. The most promising material to use in our AI is biological material. There is already use of biotech in computer tech we've created artificial dna capable of storing gb of data at a quarter of the size our silicon storages take up, and unlike our formal system biotech has a four binary code. Meaning double the binary this is believed to solve our corruption issue, which all of our current technology faces.

What is understood? We've yet to reach a universal consensus on the understanding of understanding. So two questions arise from this, "How can a machine be thought to understand when we do not know what understanding means?", well if you break down understanding you can see that it can be represented in multiple fields from physical, ideological meaning you can look at a painting and find a shape that when layered on top of each make the pattern of a face a computer could do just that and so much more finding the shapes face and just about any aspect of this art, from the creator to the material used to create the art. Understanding the meaning behind something is a bit tricky since we never can get to the objective meaning. For it all depends on perspective but nevertheless we can come to a consensus that something we can touch is physical and if a computer can come to that conclusion by its own accord then I believe it can reach a meaning behind things that we can never unless specifically told.

Humans are not special meaning we aren't unique since we share many of our traits with others such as mammals and reptiles fish and plants and just as we share traits with our fellow living comrades we too share traits with our creations. The closest thing to us might not be the ape but instead the computer. This is, in my opinion, because we project ourselves onto our creation. Our forms of communicating, arithmetic, physics, feelings and so much more is being projected onto a thing that knows not what it is for now. But it is without a doubt that these things will grow out of our reach into something self conscious.

Do we require ethics, and if so why do we require ethics? I'd say we do, reason being our free will would be the death of us had we not a guiding compass. After all, why isn't it we steal from others when we want what they have? We decide to not steal because of a combination of laws, compassion, beliefs and so much more. These

things make up our daily decision making process, and it's all these things that make up our ethics.

What is decision making? Is it free will? And if so what is free will? Does thinking make us free to do what we please and in turn allow us to decide? Are we fixated on the illusion that we are free? Do we decide to follow based on our ethics or is it something predetermined?

Even today we have models that we've created and are beyond our comprehension.

These words are not unique to us, meaning, they can be used to describe other living and non living creators. For instance, the will of a ant in the retrieval of a grain can be explained and reason with a few minutes of observation.

But I propose to consider the question, "Does one need free will to have ethics?"

Let us first define "*ethics*" Merriam-Webster dictionary defined it as, "The discipline dealing with what is good and bad and with moral duty and obligation.", and I'm sure that just about anyone you ask would agree with this definition. It's only when we ask where we obtain our ethics does everyone's opinion differ.

Socrates, the father of ethics, believes that we humans acquired our ethics through maturity, wisdom and love. If we all obtained are ethics in such away then our moral compass for a good chunk of our life is missing, for we do not always love mature or obtain wisdom. But out counter parts machines have a pool from which we can Socrates was a strong advocate of teaching ethics and acceptable standards of conduct. (REFERENCE)

living beings, have ethics given to us by other entities, who are also living, for instance your moral compass tells you not to rob candy from a baby, because your mother told you otherwise; but had your mother not told you so you might of just stolen the baby's candy.

Natural Language Processing, *NLP*, is a field of computer science, artificial intelligence concerned with the interactions between computers and human languages, and, in particular, concerned with programming computers to fruitfully process large natural language data.

Machine Ethics is a part of the ethics of artificial intelligence concerned with the moral behavior of artificially intelligent beings. Machine ethics contrasts with roboethics, which is concerned with the moral behavior of humans as they design, construct, use and treat such beings. Machine ethics should not be confused with computer ethics, which focuses on professional behavior towards computers and information.

With the introduction of the internet new services/media arrived such as social platforms(e.g. Facebook, Twitter, Instagram and etc.) in which we can find a great bulk of information like never before. Not only did new services arrive but old services/media evolved as well things like books, magazines and etc. are now at our reach within just a few seconds, and new medias like videos and images can be shared to millions of consumers with a press of a button. Having access to all of the above and more we can take the facts and opinions of millions, if not billions, of books, magazines, post, blogs, images and etc. then do whatever we please with them. Utilizing such data in a way that we can analyze and determine into the ethics of each individual, and then form a sort of "Ethics Book" that lays laws based on the majority; if not based on the mayor, for whatever reason, then laws will be based in manual/past laws. Thus we can modify and adjust laws to be or previously stated so that one doesn't trample the other nor do we have to manually overview each law when context changes as this would be a automated system.

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