

Artificial intelligence is now an integral part of our daily life. We come across things that depend on artificial intelligence every day from sci-fi films to technological advancements. Of course, there are questions about whether artificial intelligence will be beneficial for our life or not. Will the integration of AI result in mass unemployment? Will we use automated cars in the near future? Will our lives be led by artificial robots?

Although there are some who are optimistic about the emergence of artificial intelligence, pessimistic opinions still outweigh the positive ones for now. Many people remain pessimistic about the future of humanity with the existence of artificial intelligence.

There is a possibility that AI can be detrimental to our economy. But choosing to emphasize bad possibilities is harmful as artificial intelligence has the potential to change our world for the better. It can change our approach to work and offer healthcare benefits. You will discover a holistic approach to AI in this summary, touching upon both the good and the bad. With the approaches of 23 different AI experts interviewed in this book, you will have a detailed idea about the potential of artificial intelligence.

Chapter 1 - Artificial intelligence uses various deep learning methods to finish its tasks.

Let's go back to your childhood. Can you recall the moment when you saw a cat or a photo of it for the first time? How long did it take you to register what a cat was?

Usually, people become able to tell the difference between a cat and another animal after seeing one or two cats. Fundamentally, just a few examples are enough for people to learn what a certain object is. Yet, the situation is vastly different for artificial intelligence. For AI to register the difference between a cat and another animal, it must use various methods to learn. A type of machine learning called deep learning is influential in the development of artificial intelligence.

AI starts its training to understand and differentiate objects with a neural network. A neural network is a software that consists of various layers of neurons, which imitate the practices of the human brain.

Scientists resort to various methods to train neural networks. One of the commonly used methods is a kind of deep learning where the various examples are introduced to AI. Each of these examples consists of a description. When the AI is trained with enough information, a photo of a cat is shown to it. The pixels in the photo are identified by the neural network and then the machine becomes able to confirm that the photo in front of it is a cat.

Despite being able to identify correctly, the AI is still not aware enough to understand what the word "cat" means. It knows what a cat looks like, but it has no idea whether the cat is a living being or not. To give AI the ability to understand the essence of objects, it should undergo a practice called grounded language learning. This method is a deep learning strategy in which real-life images, videos, or objects are linked to sentences or words.

Such methods help deep learning gain different sorts of potential applications. For instance, grounded language learning contributes to AI's language skills. AI that has developed sufficient language skills, in turn, gives opportunities for applications like Siri to emerge. In addition, scientists have resorted to deep learning to train AI to play games. One of the well-known examples is the AI AlphaGo, which was trained by exposure to various Go games. The AI soon became competent enough to beat the human champion of Go.

Chapter 2 - Deep learning has its limits.

AI is often acclaimed for being able to beat humans at games such as chess, Go, or shogi. But while we are impressed by these kinds of success stories, AI is still yet to develop a general intelligence. For the time being, AI is only competent at tasks that are really specific.

Let's explore the case of AlphaZero. It used deep learning to observe two-player games like chess and Go. And while it was quite good at such games, AlphaZero would be totally useless when it came to different kinds of games, like poker.

Different from chess or Go, poker is not fully observable. It consists of partial information, meaning that it is impossible to see what both parties have in their hands while playing. So, if we were to train AI to play poker, we would need algorithms that would be able to guess the movements of the other party. AlphaZero is not programmed in a way to be able to do that. It is conditioned to assume that what is observable is the only information that is available.

For now, AI is unable to finish general tasks. It needs thorough training for one specific task to be able to complete it. There is also another big issue with deep learning and neural networks.

It is a well-known fact that humans are not objective beings. Even if we try to get rid of our biases, we are unable to do that completely. That is why the data with which we teach deep learning and neural networks are flawed. For example, in the case of policing, since some districts are patrolled more in comparison to others, we end up with more data about those districts. Considering this fact, if we trained AI to guess the possibility of crimes based on this flawed data, we would end up with biased information about which districts are more likely to be at risk.

The fact that deep learning strategies are limited means that they do not provide sufficient opportunities for scientists to develop the AI further to use Artificial General Intelligence, also known as AGI. A machine with AGI would need to use common sense to assess new situations and make decisions based on its evaluation of the situation. In other words, it should be able to form opinions even though it has never experienced the said situation before.

Still, scientists are adamant about finding new methods to enhance the interpretation skill of artificial intelligence. And there are some methods to help machines develop common sense. The first one is to give enough information to AI's brain while following logical rules. This method is not quite effective as it means compiling limitless information and giving it to AI. Another method is to simply hope that AI will start to develop common sense by interpreting the world around it and learning the way things operate.

Of course, these two are not the only ways that can help artificial intelligence develop common sense. It is possible to combine neural networks and logical rules to create a system that can help AI. Let's hop onto the following chapter to learn more about this hybrid system.

Chapter 3 - Hybrid systems can be what we need to further develop AI.

To enhance machine learning techniques, various methods have been tried and some of them worked while others didn't. The emergence of deep learning has had a similar experience in the past as well. The method was first discovered in the 1950s, but it was rejected by scientists for not being effective until the 1960s. And today, deep learning maintains its position as the most prominent machine learning strategy.

It is obvious that deep learning will continue to be a big part of artificial intelligence in the future as well. But since it is limited by nature, it is impossible to depend on deep learning alone to develop AGI. The creation of AI needs a hybrid system that will combine various methods.

Humans are lucky enough to have a natural ability to learn. The only example of an interpretative intelligence that is lesser than that of an adult human is the example of a child. This fact is what led scientists to assess children to understand more about how the structures of the human brain operate in order to learn.

Demis Hassabis, a neuroscientist and a researcher, states that using a combination of reinforcement learning and other methods will be necessary in order to develop AGI. He believed that the dopamine system in humans should be mimicked, where synapses in the brain get stronger each time they receive reward signals. Scientists can use this system to order an AI to finish a task and reward it each time it finishes the task.

There are various ways the human brain uses to learn. One of those ways is unsupervised learning, meaning that we gain information on things simply by walking around and discovering our surroundings. If scientists can uncover how to integrate this kind of learning into AI, they will be free from the task of providing numerous data to it. Such a discovery will be a breakthrough.

Scientists can create AI with an underlying structure like human brains. Using deep learning along with the structures mimicking the human brain is not really new. The self-driving cars that we use today are already using a hybrid system like this.

How so? Let's think about it: those cars should be able to decide what to do when they are on the road. They operate on data gained via deep learning, but as we have mentioned before, deep learning is not enough to predict an infinite number of potential situations. What this means, is that humans build in rules so that the cars can predict various new situations they can potentially experience. And the rules help them decide on what their responses would be in such new situations.

Self-driving cars are indeed interesting to explore, but they are not the only places where we benefit from AI. The following chapter will explore various ways where we use AI.

Chapter 4 - We can benefit from artificial intelligence to make our lives better.

In the past, scientists have been doubting AI's objectivity and arguing that it wouldn't escape from being biased since the data given to them by humans are biased and stereotypical. Academic researchers are also aware of the tendency of AI to be biased, but they also emphasize the possibility to use this to our advantage. They suggest that scientists can use AI to get rid of biases.

We as humans cannot get rid of our biases if we just think about them alone; however, computer scientist Fei-Fei Li states that seeing our biases from an outsider's perspective gives us the opportunity to correct them. Thus, we can say that AI could be influential in helping humans get rid of biases.

This possibility is not unrealistic, either. Affectiva, created by Rana el Kaliouby who is a computer scientist and entrepreneur, is already using AI's skill to eliminate biases. Kaliouby argues that it is time scientists begin considering the emotional intelligence of machines and stop focusing on their technical intelligence.

Affectiva integrates algorithms and language processing techniques to create an AI hiring tool that is free of any subjectivity. Candidates that will be assessed by Affectiva send video interviews. Their non-verbal communication skills and answers are then evaluated by artificial intelligence. The result? One of the companies that are testing the system, Hirevue, stated that their hiring time was reduced by 90 percent. What is more, the diversity between newly hired people has increased by 16 percent.

Another plan of el Kaliouby is to support children who are diagnosed with autism, as they experience difficulty in assessing the atmosphere around them. Her team of scientists has contributed to the making of special glasses that can "read" the emotions of other people. These glasses can also provide feedback to the user about the emotions it reads. As a result, children on the autism spectrum are able to make more eye contact and develop a better understanding of other people's emotions.

These are not the only ways we benefit from AI. There are many other areas where AI can help the common people. For example, we can use machines for our mundane tasks like folding the laundry or ironing clothes.

There is more. The director of Engineering at Google, Ray Kurzweil, argues that in the future we will have nanorobots in our bloodstreams. These nanorobots will be able to support our immune system, prolong our lifespan, and even create a connection between our brains and the Internet.

Chapter 5 - AI helps scientific developments immensely, especially in healthcare.

It is not a surprise that many hospitals are still full of stressed doctors and nurses. Healthcare professionals are required to work long shifts, lead hectic lives; therefore, they are susceptible to feel exhausted and stressed out.

Doctors and nurses feeling burnout means that the healthcare patients receive may not be as extensive as compared to the treatment provided by healthy and well-rested professionals. Indeed, physician error maintains its position as the third most common cause of death in American hospitals.

Fortunately, AI can support healthcare immensely. Entrepreneur Oren Etzioni states that delaying the integration of AI and healthcare means that we will lose lives that could have been saved.

Since healthcare has many sub-fields, there are various ways where we can benefit from AI.

Currently, neural networks can recognize when images presented to it include specific objects, like a cat. Thus, they can be trained to detect if there is a tumor in a radiology scan.

Similarly, artificial intelligence can be used in recognizing symptoms of depression as well. As of now, we have no choice but to trust the symptoms given by a patient. But artificial intelligence can be used to detect facial and vocal biomarkers of depression to recognize symptoms that go unnoticed by humans. An AI that can scan faces and voices can easily recognize the symptoms of depression and help doctors give errorless diagnoses.

If machines are trained to carry out some of the tasks in the healthcare area, then doctors and nurses would have more time and they could be more efficient in serious cases. AI can use algorithms to evaluate patient information and give feedback to doctors, patients, or their families. This way, AI can help physicians and patients save time.

Of course, there are various areas other than healthcare where we can use AI. It can also help scientific researchers. Oren Etzioni's project called Semantic Scholar uses AI to improve scientific research. Being up to date on the science world means scientists need to check the latest publications and considering that there is an unlimited amount of new research on various topics each day. Semantic Scholar helps those scholars by offering them research that they might be interested in and highlighting important information in those papers.

We have touched upon what good AI can do for us. But is it a possibility that AI can be used for destructive purposes? In the next chapter, we will explore what can possibly go wrong with the use of artificial intelligence.

Chapter 6 - Artificial intelligence can be weaponized.

We all know humans have evolved to be more destructive over time. Bows and arrows from the past gave way to highly technical bombs.

Nowadays, many people have access to drones, the newest technical hotshots. Anyone with access to drones can turn those devices into weapons by adding small bombs. Fortunately, these drones can only hold one bomb, and they can be used by a single person. Thus, they cannot be scaled to destroy the whole world.

Still, it's technically true that any kind of armament can be mass-produced and employed by the military. Thanks to the international sanctions and military readiness, such an issue is unlikely to occur. But we still don't have enough sanctions to control autonomous weapons on an international scale. Autonomous weapons refer to weapons where a person can control an army of drones from a remote distance.

Those weapons pose a high risk to humanity because they are easily scalable. Numerous drones can be controlled by a single person without many people noticing. Let's say you control 10 million autonomous drones at the same time, probably only five or six people will notice them before you attack humanity just by clicking on a button. What is more, these drones can be trained to attack or murder specific people –they can filter every female that is aged between 12 and 60.

As you can guess, developing autonomous weapons will have massive risks. One of the most likely scenarios is that countries will race each other to be the first to create such weapons. Those weapons, since they are programmed, would be susceptible to being hacked by enemies from other countries as well. In such a case, the country would be destroyed by its own weapons.

Considering these plausible possibilities, we should always keep in mind the potential danger of such autonomous weapons if we want to develop them. International sanctions and government regulations are great ways to prevent risky outcomes. The researchers should try to make sure that they are developing the safest systems possible.

AI can still be weaponized in other ways. For example, using advertisements to manipulate the votes of common people in an election. Indeed, Cambridge Analytica has benefited from Facebook user data to help Trump win the 2016 campaign.

Still, the potential risks of AI are not limited to weaponization. The possibility of mass job loss remains a concern for the future.

Chapter 7 - Universal basic income or monetary support for education can aid the issue of job automation.

Suppose that you won't have to work anymore in a few years. Do you feel pleased by the news? Or are you scared of what will happen to you?

The fast development of artificial intelligence means that in a few decades most jobs could be automated. The most common examples are occupations with relatively simple, mechanical tasks such as cashiers, truck drivers, accountants, factory workers.

Automation of jobs means that people who were employed for these positions will be laid off. So, how are they going to survive? There are, of course, some possible solutions to fix this issue. The majority of people the author interviewed have expressed their opinions that a kind of universal basic income would be necessary for such cases.

UBI will definitely be an essential need when the majority of a sector is automated. Since artificial intelligence would help a business's productivity tremendously, the revenue of companies could be gathered to provide monthly stipends to the citizens.

The real question is whether the UBI will be needed or not. Considering human history, every time there was a groundbreaking technological development emerged, it was assumed that people would end up losing their jobs as a result. But we see that each time some jobs are eliminated by machines, new ones have emerged. Just a decade ago, nobody would assume that people could earn money by managing social media accounts. Now, there are various ways to gain money on social media.

People that lose their jobs can undergo a strict education program. Countries could gather funds to support people without jobs to get educated and find new career paths. This suggestion is referred to as conditional basic income.

Still, the most probable outcome is that we won't allow robots to dominate our lives completely. Jobs that are based on the human connection will continue to thrive. For example, while it is completely conventional to buy music on digital platforms with just one click, we still wish to attend concerts to turn listening to music into an event that will connect people. And we do that despite the fact that concerts cost a lot more than buying digital music. Thus, jobs that revolve around human connections or motivating people will be more on the rise as robots start to dominate other professions.

Of course, the thought of losing your job is worrisome. But scientists argue that AI poses much more serious risks. Some even argue that the technology of AI can potentially result in an apocalypse.

Chapter 8 - The potential risks of Artificial General Intelligence raise controversy.

It is not shocking that the rapid development of AI has caused concern among some people. But concerns toward the human-like AGI has not been as public as the concerns for AI itself. How would our society be if the robots outnumbered humanity vastly and became much better versions of humans?

Of course, robot domination still remains an unrealistic scenario. However, philosopher Nick Bostrom and other researchers emphasize the potential risks of the development of AGI.

Have you ever heard of the famous thought experiment paperclip problem? Nick Bostrom fundamentally lays out the potential risks of AGI with the paperclip problem.

Suppose that you train AI to operate a paperclip factory. Not so surprisingly, the AI gets better each time it creates a new paperclip and becomes efficient in managing the factory and mass-producing paperclips. Eventually, the AI betters itself so tremendously that it comes to the conclusion about the most efficient way to make paperclips: to seize control and turn the world into paperclips.

This scenario, of course, is a lighthearted example. Yet the scary ability of AI to become “too good” with the tasks it is assigned is demonstrated really well.

The general conclusion of the researchers the author interviewed is that Bostrom’s prediction does not reflect the truth. They emphasize that there are various methods with which we can prevent such a situation from happening. For instance, the power to control an electrical grid wouldn’t be given to the AI. A more beneficial way to prevent the dystopic scenario is to train the AI to understand the concepts of good and wrong. A well-developed AI wouldn’t work with the sole aim of making paperclips.

There are better ways to hinder a potential AGI apocalypse. Bryan Johnson proposes the radical idea that we have to improve humanity along with artificial intelligence. In order to achieve improved humanity, Johnson founded the company Kernel, which aimed to benefit from neuroscience to upgrade our brains. His idea was to use neuroscience to hack into people’s brains and benefit from a computer chip implant to upgrade their cognitive abilities.

There is not a consensus on when we would achieve AGI. Still, we should keep in mind the pros and cons of artificial intelligence and prevent any possible risks of intelligence that rivals ours.

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Artificial intelligence has helped humanity immensely with the rapid development of deep learning and neural networks. Still, scientists need more research on Artificial General Intelligence, a hybrid form of intelligence that will transform robots into entities that can train themselves and interpret the world. Perhaps we won’t be able to see the creation of AGI in our lifetime, but we will live enough to see the impacts of AI in various fields such as healthcare and the military.

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