



Lesson 130

The Rise of Artificial Intelligence

- **Artificial Intelligence (AI)**
 - Four Industrial Revolutions
 - The history of AI
 - How smart is AI?
 - ChatGPT and other chat bots
 - AI generated videos and pictures
 - AI in medicine
 - AI spreading disinformation
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AI is becoming a bigger and bigger part of our world, and today we are going to learn more about it. First, we are going to look at its history and see how many are calling this the fourth industrial revolution. We are also going to define exactly what it is and try to understand if Artificial intelligence is actually intelligent. We will also see some of the ways it is used today, like ChatGPT. Finally, we look at the downsides like its increasingly prominent role in disinformation.

Artificial Intelligence

Four Industrial Revolutions

We are currently living in what can be described as the fourth industrial revolution. This revolution is marked by the large-scale use of AI and other cutting-edge technologies. Back in the 1700s, all tasks such as mining and agriculture were performed by hand. But in 1712 the steam engine was invented, which led to the beginning of what we called the first industrial revolution - from 1760 to 1820/1840. This revolution was the shift from hand power, to machines, powered by steam and water. Next, in the 1800s, people began to learn that electricity can be harnessed and used to power certain things. Thus, the second industrial revolution began, which took place from 1871 to 1914. Electricity in manufacturing, and the construction of telegraph lines were two of the most prominent inventions during this revolution. Thirdly, the late 1900s brought about the third industrial revolution. With all the different ways in which electricity was being used, the computer was finally invented. This became known as the “Digital Electronics Revolution” and during this time, nuclear weapons were also being invented. Finally, we arrive at the fourth industrial revolution, which began in the 2010s. During this time technologies such as augmented reality, gene editing, machine automations, and more have been invented. However, the primary technology during this time is Artificial intelligence. Just like the invention of machines completely changed the lives of workers, how the use of electricity opened up the floodgates to the ability to power anything, or how computers permanently digitized our lives and how we interact - AI will change society in some way. It has been blurring between physical and virtual reality and has the potential to change our ideas of what a human is, or what it means to be alive.

The history of AI

Artificial intelligence, or AI, is not a new concept. Way back in the early 1900s this concept was being discussed. However, the reason that it did not take off back then was because computers were not powerful enough and were too expensive to run (as in up \$200,000 a month). This was the kind of money that only large companies and institutions could afford, and for them to invest in AI there had to be a really good reason. On top of that, computers in those days could take commands from people but didn't store the commands. For AI to work, the machine has to “remember” what it did so that it can learn from that and adapt. Then came the year 1956. Allen Newell, Cliff Shaw, and Herbert Simon invented Logic Theorist, which was designed to solve problems, much like people do. It is considered the first AI program. It was after that that people saw the achievability of AI and in the upcoming years would put time and money into the research of it. However, because it was so early on in the development of AI and computers themselves, much progress wasn't made and eventually people lost interest. It wasn't until the 1980s that interest in AI was once again restored with money investments and computers being able to “learn”. But when the goals that those researching it set weren't met, people forgot about AI. Ironically, it was the time when AI was behind the scenes, not being funded by the government or talked about in the public, that it made significant progress. Today, AI has progressed so much from where it started, and it will only continue to get better.

How smart is AI?

AI is smart - but many experts will say that it is not actually “intelligent” like us. In fact, some say that AI is just about as smart as a dog or a cat. This is because AI doesn’t have the capacity to learn or understand like us. Most AI is trained with large amounts of data in order to learn simple facts - something that we do not need to do. AI also doesn’t have emotions which is very important to how humans operate; for example, in 1997 an IBM computer beat Russian world champion chess player Garry Kasparov - he was extremely hurt, but the computer was not. There are several other examples of AI showing a kind of intelligence, but it often depends on the context and how it was trained. For example, AI has passed many tests that people have to take for school/college, including the Bar (which is a test taken in the United States to be able to practice law). But there are a few problems with testing AI’s intelligence this way. First, it is hard to know if the AI was trained with the exact questions found on these test: therefore showing how they know the answers; and it can also be shown that they don’t do well if a question is reworded to ask the same thing - just in a different way; also sometimes AI don’t answer the question outright, but use other clues to determine the answer (for example although AI passed a test identifying cancerous tumors on the skin it was because the AI knew to pick the pictures with rulers in them since it had learned that rulers usually meant cancer [the AI did not consider the tumors themselves]). There is also the question of AI possessing creative intelligence. In 2014, an AI named Eugene (programmed to act like a 13-year-old boy) passed the Turing test. The Turing test is a test made to see whether people could identify whether the “person” they were having a conversation with was a human or not - if the 30 judges thought the AI was a human 30% of the time it passed. Eugene was mistaken for a human 33% of the time. Even though AI is not intelligent like us (yet - as many experts say that it will happen in the near future), sometimes it is easy to think that they are, especially when interacting with one in a question/answer format: which is how most people do, but in reality, they only have a kind of intelligence.

ChatGPT and other chat bots

If you had to name different AI technologies today, chat bots would be one of them, as they are one of the most popular forms of AI. Chatbots are able to read a user input and produce an intelligent response; they obtain this ability from an AI technology called a Large Language Model, or LLM. An LLM is a type of algorithm that is given huge amounts of data from online sources, books, and more. The LLM is trained on this data and learns how to predict the next word in a sentence based on what it is given. It continues to generate word after word until it believes a response is complete. Prominent LLMs include Open AI’s GPT and Google’s Gemini. These LLMs have been used to build chatbots like ChatGPT and Copilot (both built on GPT) and Bard (Built on Gemini), which have for the most part become the face of AI to the public.

AI generated videos and pictures

Artificial intelligence can produce realistic photos and videos now. AI accomplishes this through having access to tons of images and the text that is associated with them. For example, if you search “dog” on Google, you will get pictures of dogs. AI then associates the pictures of dogs with the word dog. “At the core is what’s called a ‘generative model,’ which learns the properties of a collection of data and can then create new data that statistically fits in with the original collection. As well as making images, this approach can be used to write text, compose music, or answer questions,” *Where the AI Art Boom Came From - and Where It’s Going, Wired*. The AI generated photos that we see today have their roots in a program that was invented in 2014 called Generative Adversarial Networks (GANs). It was invented by Ian Goodfellow, and it did two things: create an image that resembled something real and then compare the real and fake. By comparing the two,

the machine taught itself to get better at making the fake look real. Today, AI has gotten so good at making the images and videos it generates look so real that if someone wasn't looking hard enough, they might think they're real.

AI in medicine

Medicine is an example of a field where AI is being used to make people's jobs more effective. One example of the use of AI in healthcare was COVID-19, when it was used to predict hotspots thanks to contact tracing. AI can also be used to diagnose diseases from symptoms that patients are presenting or flag possibly problematic areas on scans/pictures. Sometimes it is more accurate than doctors, and it is also faster: this is possible because AI can be trained with a lot of data, and it can sort through it very quickly. AI can also be used in drug discovery as it can model possible medicines effectively. Because of the way AI is trained it is also helpful in research. AI will not (at least anytime soon) take over the medical field, but its use does help doctors perform their tasks more effectively and with less stress.

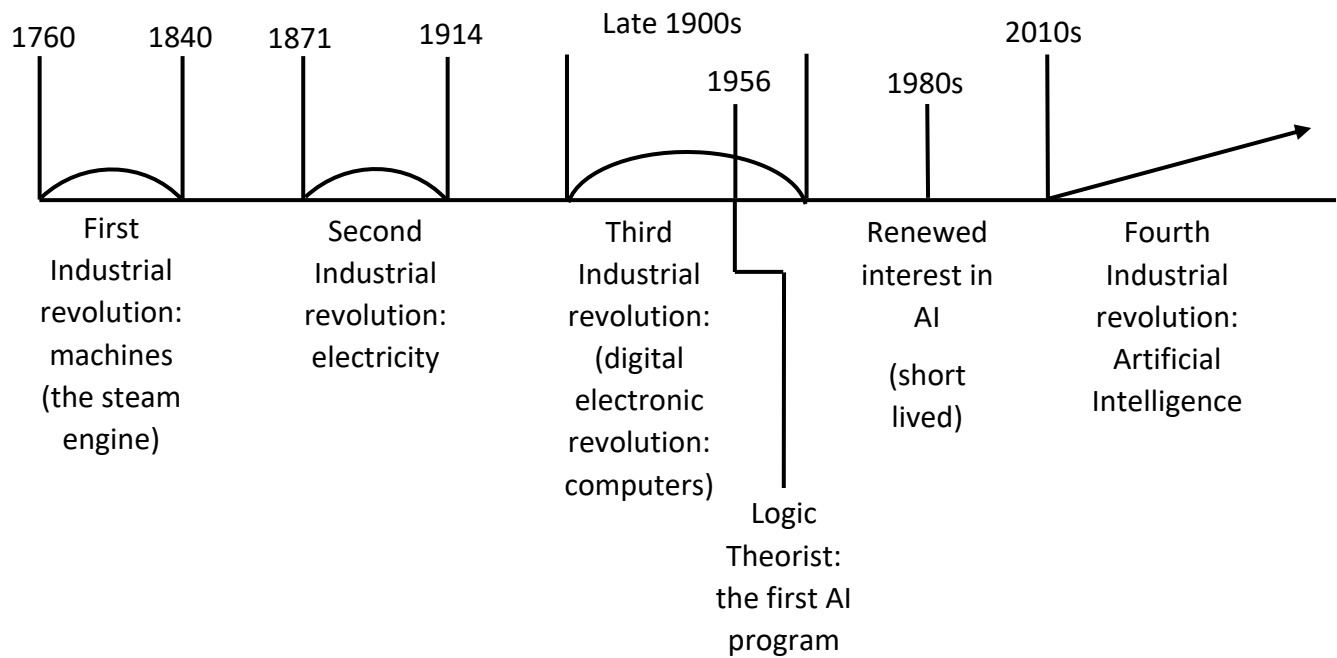
AI spreading disinformation

As much as there might be benefits from AI getting smarter over the years, there will always be negative consequences. Disinformation is a major concern, since AI is becoming a very easy way to spread lies on the internet. Governments are beginning to use AI to generate data to sway public opinion in their favor, resulting in an increase of that government's power. In Venezuela, AI deep fakes were used to make people believe they were watching a news video from an English Channel outside the country. In the United States, fake pictures of Biden and of Trump have been circulating the web. However, feeding people disinformation isn't the only drawback of AI; sometimes it can be used to cast doubt on truthful information. For example, in 2023 when unfavorable audio of an Indian official was leaked, he claimed it was AI generated, when in actuality it was real. Governments are also using AI technologies to censor information that makes them look bad online. All these types of disinformation, and more, have been enabled due to the growing practicality of using AI, and we can expect it to get worse in the future.

Downsides of AI

AI does have its downsides, particularly the part where it's going to take over people's jobs and put millions of people out of work. But in addition to that, AI such as ChatGPT has issues such as plagiarism. It raises questions such as how much does it copy verbatim or paraphrasing from its sources without crediting the source? "AI systems, particularly complex models like deep neural networks, can be hard to control and interpret," *Breaking Down the Advantages and Disadvantages of Artificial Intelligence*, IBM. The reason that it is hard to control is because people know point A and point Z, but they don't know B-Y, or how the computer got from A to Z. And if they don't know the progress then they can't determine where the computer went right or wrong. And it is this process that will allow AI to take over the world one day.

In Summary:



You

are you smart?

< 1 / 2 >



ChatGPT

I'm an artificial intelligence designed to assist with various tasks, so in that sense, I am programmed to be knowledgeable and helpful. However, I don't possess consciousness or subjective experiences like humans do, so I wouldn't say I'm "smart" in the same way a person might be. My abilities are based on algorithms, data, and programming rather than independent thought or understanding.



AI can do other things besides give information, like:

- AI can generate images.
 - Prompt: spring hill covered in flower buds at dawn after a rainy night (via hotpot.ai)
- AI is also useful in the medical field with things like diagnostics.



AI has also been used to spread disinformation (sometimes even by governments) through things like fake videos and pictures in order to sway public opinion. This also leads to doubting other pieces of media - whether they are real.

Some problems that AI can cause:

- People losing their jobs because it is more convenient for a computer to perform it.
- Plagiarism - because it is hard to tell where chatbots like ChatGPT get their information.

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https://www.youtube.com/channel/UCeltzVajTXgSQRL-o2XOq_g

Link to YPG Zoom meetings which are at 10:00am Pacific Time on the 1st Sundays of the month:

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