

Artificial Intelligence and Machine Learning

Artificial Intelligence

Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind

Artificial Intelligence

- It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.
 - John McCarthy, 2004

Artificial Intelligence

- Alan Turing (father of computer science)
 - Computing Machinery and Intelligence
 - "Computing Machinery and Intelligence" is a seminal paper written by Alan Turing on the topic of artificial intelligence. The paper, published in 1950 in *Mind*, was the first to introduce his concept of what is now known as the Turing test to the general public.

Artificial Intelligence

- Four potential goals or definitions of AI, which differentiates computer systems on the basis of rationality and thinking vs. acting:
 - Human approach:
 - Systems that think like humans
 - Systems that act like humans
 - Ideal approach:
 - Systems that think rationally
 - Systems that act rationally
- Alan Turing's definition would have fallen under the category of “systems that act like humans.”

Artificial Intelligence

- Types of artificial intelligence—weak AI vs. strong AI
 - Weak AI—also called Narrow AI or Artificial Narrow Intelligence (ANI)
 - AI trained and focused to perform specific tasks
 - Weak AI drives most of the AI that surrounds us today
 - Apple's Siri
 - Amazon's Alexa
 - IBM Watson
 - Microsoft's Cortana
 - Google Assistant
 - Samsung's Bixby
 - Autonomous vehicles

Narrow might be a more accurate descriptor for this type of AI as it is anything but weak

Artificial Intelligence

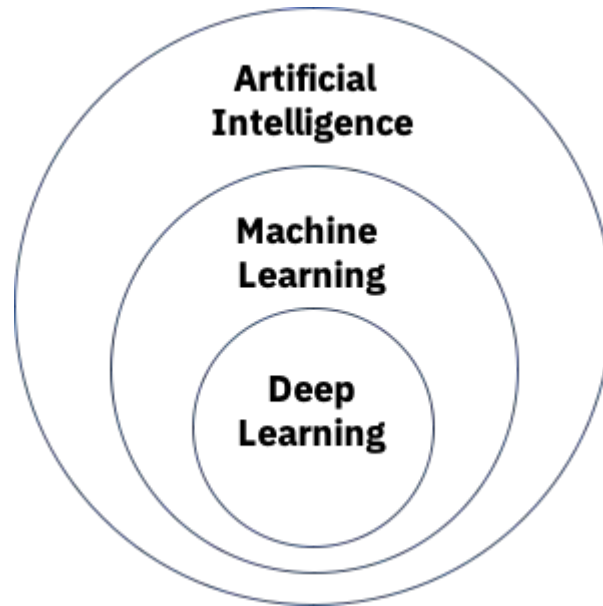
- Strong AI is made up of Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI)
 - Artificial general intelligence (AGI), or general AI, is a theoretical form of AI
 - A machine would have an intelligence equal to humans
 - Self-aware consciousness
 - Ability to solve problems
 - Ability to learn
 - Ability to plan for the future

Artificial Intelligence

- Artificial Super Intelligence (ASI)—also known as superintelligence—would surpass the intelligence and ability of the human brain. While strong AI is still entirely theoretical with no practical examples in use today, that doesn't mean AI researchers aren't also exploring its development. In the meantime, the best examples of ASI might be from science fiction, such as HAL, the superhuman, rogue computer assistant in 2001: A Space Odyssey.

Machine Learning

- Machine learning is a sub-field of AI
- Consists of deep learning vs. machine learning



Machine Learning

- Classical, or "non-deep", machine learning is more dependent on human intervention to learn
- Human experts determine the hierarchy of features to understand the differences between data inputs, usually requiring more structured data to learn.

Machine Learning

- Deep learning is actually comprised of neural networks
- “Deep” in deep learning refers to a neural network comprised of more than three layers—which would be inclusive of the inputs and the output—can be considered a deep learning algorithm

Artificial Intelligence

- There are numerous, real-world applications of AI systems today. Below are some of the most common examples:
 - Speech recognition
 - Also known as automatic speech recognition (ASR), computer speech recognition, or speech-to-text
 - Customer service
 - Online virtual agents replacing human agents
 - Computer vision
 - Enables computers and systems to derive meaningful information from digital images, videos and other visual inputs

Artificial Intelligence

- Recommendation engines
 - Using past consumption behavior data, AI algorithms can help to discover data trends that can be used to develop more effective cross-selling strategies. This is used to make relevant add-on recommendations to customers during the checkout process for online retailers.
- Automated stock trading
 - Designed to optimize stock portfolios, AI-driven high-frequency trading platforms make thousands or even millions of trades per day without human intervention.

Artificial Intelligence

- Future applications
 - Medical assistants
 - Psychological evaluations
 - Companion automatons

Artificial Intelligence

ChatGPT

- What is it?
- What are the issues surrounding it

ChatGPT

A product of OpenAI, a company founded in 2015 by a group of investors that included Elon Musk

OpenAI conducts AI research with the declared intention of promoting and developing a friendly AI

OpenAI systems run on the fifth most powerful supercomputer in the world.

ChatGPT

GPT- What is it?

GPT stands for Generative Pre-trained Transformer

It is a large-scale unsupervised language model developed by OpenAI that is capable of generating human-like text.

ChatGPT

OpenAI created a GPT AI engine that is now in its 3rd generation - therefore known as GPT-3

GPT-3 has a web and API interface into it to allow user and program access to GPT-3 facilities

GPT-3 has many AI facilities available, like one to convert programming code from one programming language to another

The most well known facility and the one of most interest to us is the chat facility

ChatGPT

The primary web interface to GPT-3 (“playground”) gives access to all the facilities.

So if one wants to chat one must select the chat function from a drop-down list of available functions.

When OpenAI decided to open up GPT-3 to the world they created a new web interface that went straight to the chat function and called it: ChatGPT

Released November 2022

ChatGPT

ChatGPT has been free but may not be available much longer

Openai and Microsoft have a contract to merge GPT with Microsoft's search engine Bing

Currently the new Bing with GPT is in limited testing

However, the chat function will likely still be available from OpenAI through their “playground” interface

ChatGPT

ChatGPT issues

- GPT-3 very often returns wrong information
 - Estimates are as high as 40% of completions
 - One writer asked GPT-3 to write an article about this year's superbowl game. GPT-3 returned an article about last years.
 - A major problem is that GPT-3 has no current event data past 2021

ChatGPT

But there is an even bigger issue:

- Writers for newspapers and magazines are using GPT-3 to do their writing for them
- College students are using GPT-3 to write term papers and theses for them
- Very likely school children are using GPT-3 to complete schoolwork assignments

One has to question whether there is any real learning going on

ChatGPT

Solutions to the dilemma

- ChatGPT may not be available much longer.
However, the new Bing may still do the same thing. And if the writers and students know how to access the “playground” feature this may not be enough
- In January of this year a college student developed a ChatGPT detection tool called GPTzero
- OpenAI announced earlier this month they are developing ChatGPT detection tools as well

ChatGPT

As an interesting side note, Google is trying to keep up with their own version of AI to incorporate into the Google search engine called Bard

Bard failed miserably on its first demo

But we shall see....