

Concepts, definition, and history of AI and interaction with AI

The History of AI

Governments funded the building of expensive computers at a few universities after seeing their potential due to its role in code breaking during World War II. In 1949, Alan Turing, a leading code breaker created a sensation when he indicated how these computers may be used. He wrote in the London Times that he thought that the computer could eventually simulate human intellect and be able to compete on equal terms. (Grudin, 2009).

The term “artificial intelligence” was used for the first time in 1956 by mathematician and logician John McCarthy when he called for participation to his workshop (Grudin, 2009). The workshop was called the Dartmouth Summer Research Project on Artificial Intelligence and it was held to discuss what would ultimately become the field of AI and to clarify and develop the concepts around “thinking machines” (Marr, 2018).

Defining Artificial Intelligence

John McCarthy, who first coined the term Artificial Intelligence shared his definition of AI on a “layman’s level” in an article posted at Stanford in 2004. This was his answer to the question: “What is 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.” (McCarthy, 2004)

The Encyclopedia Britannica defines artificial intelligence as such:

“Artificial intelligence (AI) is the ability of a computer or a robot controlled by a computer to do tasks that are usually done by humans because they require human intelligence and discernment. Although there are no AIs that can perform the wide variety of tasks an ordinary human can do, some AIs can match humans in specific tasks” (Britannica, n.d)

The global technology company IBM defines artificial intelligence as such:

“Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind.” (IBM, 2020)

IBM’s and Britannica’s definitions connects artificial intelligence to human intelligence – specifically how AI mimics tasks that are originally performed by humans. McCarthy’s definition describes AI as making intelligent machines and computer programs using science and engineering, and he later defines intelligence as the computational part of the ability to achieve goals in the world. If I were to make my own definition based on these three definitions, I would define it like this:

“Artificial intelligence is the use of science and engineering to create systems that imitate human intelligence.”

A brief review: Does AI make PD obsolete? Exploring challenges from Artificial Intelligence to Participatory Design.

An article written by Bratteteig and Verne (2018) explores how Artificial Intelligence potentially challenges Participatory Design. PD aims to understand technology and to open for future users to have a say in choices concerning the technology during its design and use. It can be challenging to employ PD techniques when developing AI – for example, it is difficult to create concrete AI prototypes because they are time consuming to build and rely on an adequate data set (preferably accumulated over a longer period) for it to be accurate. An algorithm will also change over time as it adapts to new data input which makes it unpredictable to design for.

The correct answer needs to be provided for the computer algorithms to improve its recognition, and the algorithm could be developed in a bad direction if someone intentionally feeds it wrong, sensitive, or possibly offensive information. The designer has a certain responsibility when designing for AI systems, for example to provide users with a choice when interacting with autonomous AI to avoid being them overruled by a system. A critique of autonomous AI is that it potentially poses a threat to the development of the human experience, sensation, and decision-making abilities because we need to make less decisions

for ourselves – the systems do it for us. Using PD techniques could help to avoid that this would happen.

Apple's Siri

Apple has an integrated voice-controlled virtual assistant called Siri in their products which gives their users the opportunity to utilize their devices' features using only their voice. On their website, they describe Siri as a service who can help you with just about anything. "Siri does more than ever. Even before you ask." They explain how Siri uses machine learning to continuously learn and become able to personalize your experience – but they also reassure you that your personal data is kept private and off limits to advertisers or other organizations who might benefit from it. Apple is transparent with the users on how their personal data is used to develop their service – and they even encourage them to interact with Siri in new ways to make her smarter. (Apple, n.d).

Do you trust this computer? – Human interaction with AI

"Do you trust this computer" is a documentary from 2018 which in short talks about the pros and cons with the use of artificial intelligence – or as they articulate it in the film, the "miracles and horrors" of it. Artificial intelligence is not good or evil, but it can be utilized for both depending on who is writing the code. AI can be utilized in healthcare to make surgery easier and help save more lives, it can be used in robots that can help clean your house or guide a blind man through the street – and it helps millions of people every day to locate information through the search-engine Google.

As of now though, it is a multimillion-dollar industry with almost no regulations, which opens opportunities for it to be used for less noble actions. In the film, machines are described as natural psychopaths. They have no emotions – and if they are given a task that could take human lives, they will complete it with no remorse. This is especially concerning regarding the development of autonomous weapons, which is part of the reason why people want to see a global ban of using this technology in warfare. They mention concerns around the possibility of artificial intelligence gaining more control than us humans – because the technology is accelerating quicker than us, and nobody fully understands the advanced algorithms used in many AI systems. (Paine, 2018) After watching the documentary I feel that

we could exploit AI and ML-techniques to advance humanity and achieve great things – but at the same time I am left with the feeling that it could affect us horribly if the technology is not regulated properly.

Robots and AI systems

The origin of the word Robot.

The word robot was first introduced by Czech writer and journalist Karel Čapek in his play “R.U.R” (Short for Rossum’s Universal Robots) in 1921. It stems from the word *Robota* in Czech and can be translated to work of duty. The play illustrates robots as scary beings – as they eventually run amok and exterminate mankind. (Store Norske Leksikon, n.d)

Defining “Robot”

The Encyclopedia Britannica defines a robot as such:

“Robot, any automatically operated machine that replaces human effort, though it may not resemble human beings in appearance or perform functions in a humanlike manner.” (Britannica, n.d)

The dictionary of Cambridge defines a robot as such:

“[a robot] is a machine controlled by a computer that is used to perform jobs automatically.” (Cambridge Dictionary, n.d)

If I were to make my own definition based on these two, I would define it like this:

“A robot is an automatically operated machine that is used to perform labor, and it may or may not have features that resemble human behavior and/or appearance.”

AI vs. Robots

Artificial intelligence and robots are closely related technologies. I think that they are similar in the way that both can and often aim to imitate human behavior to perform a task. They might differ because I perceive a robot as more of a physical object that does the job, rather

than the possible non-physical artificial intelligence that makes it behave in the way that it does. I perceive AI as a feature that a robot can have, but not the other way around.

The robot lawn mower

Having a robot lawn mower has become an increasingly popular item in the ordinary household. Professor Guri Verne (2020) has written an article on how she adapted to hers to make it work in the manner it was supposed to. The robot is supposed to replace the human physical labor of mowing the lawn – but Verne explains how she was surprised over how much labor she still had to do for the robot to cut the grass in her garden. For example, the garden had to always be clean when the robot started, which meant there could not be a hose or a shovel laying around. The article entails that there is minimal human interaction with the lawn mower robot itself, but the garden must be prepped for it to work correctly. It starts automatically, then proceeds to do its job by cruising around the garden and cutting the grass, while potentially destroying things or getting stuck along the way depending on how well the garden is prepped.

Universal design and AI systems

Defining Universal Design

The Centre for Excellence in Universal Design posted a definition of Universal design that originates from The Disability Act 2005. They define Universal design as such:

1. *The design and composition of an environment so that it may be accessed, understood and used*
 - i. *To the greatest possible extent*
 - ii. *In the most independent and natural manner possible*
 - iii. *In the widest possible range of situations*
 - iv. *Without the need for adaptation, modification, assistive devices or specialised solutions, by any persons of any age or size or having any particular physical, sensory, mental health or intellectual ability or disability, and*
2. *Means, in relation to electronic systems, any electronics-based process of creating products, services or systems so that they may be used by any person.*

(The Centre of Excellence in Universal Design, n.d)

Universal design in electronic systems aims to give all members of society an equal opportunity to utilize these systems – regardless of whether they have the same physical or mental abilities.

The potential of AI with respect to human perception, human movement, and human cognition/emotions.

AI has great potential in extending and accelerating human capabilities. It is possible for amputees to get a robotic prosthesis to replace their missing arm or leg – which then makes them more capable of participating in society like “normal” because they can now walk up the stairs or wave to people on the street. Pet-robots have also been created to accompany elderly who suffer from dementia. They are furry robots who look like real animals, and they provide emotional support.

The potential of AI for both including and excluding people

AI can only learn from data it receives and interacts with – which makes it prone to appear biased. For example, if a filter on Snapchat is only tested with white people, the AI is trained to better recognize their features which can exclude black people from being able to interact with the filter. AI can also be very inclusive, as there are programs that makes blind people able to interact with a smartphone.

Do machines understand?

I think “to understand” entails that you have learned something, and that you are able to interpret that knowledge and use it in another context. I do not think that a machine can understand, because I think it only acts according to the direct data it is given and has learned from. If the machine was put in a new environment with no new data and was expected to figure out how to succeed, I assume it would fail.

Guideline for Human-AI interaction

Microsoft Guideline 12

Microsoft's 12th guideline for Human-AI Interaction Design reads "Remember recent interactions. Maintain short-term memory and allow the user to make efficient references to that memory". An example where this rule is practiced is in any web-browser. The browser remembers your search history and will recommend a page you have previously interacted with when you start typing in the search bar.

Similarities and differences: HCI design guidelines and the Human-AI interaction guidelines.

Nielsen and Molich's 10 user interface design guidelines and Microsoft's guidelines for Human-AI interaction design share several similarities and some differences. For example, both highlight the fact that you should be able to understand the systems' intended use immediately, and that the system shows you task-relevant information – often based on your previous choices. The user interface design guidelines differ because they also mention the preferred aesthetic of the system – which is to keep clutter at a minimum.

References

Apple. (n.d) *Siri*. Available at:

<https://www.apple.com/siri/> (Accessed: 7.9.21)

Bratteteig, Tone. Verne, Guri. (2018). *Does AI make PD obsolete? Exploring challenges from Artificial Intelligence to Participatory Design*.

Britannica. (n.d) *Artificial Intelligence*. Available at:

<https://www.britannica.com/technology/artificial-intelligence> (Accessed: 7.9.21)

Britannica. (n.d) *Robot*. Available at:

<https://www.britannica.com/technology/robot-technology> (Accessed: 7.9.21)

Cambridge Dictionary. (n.d) *Robot*. Available at:

<https://dictionary.cambridge.org/dictionary/english/robot> (Accessed: 7.9.21)

The Centre for Excellence in Universal Design. (n.d) *Definition and overview*. Available at:

<http://universaldesign.ie/What-is-Universal-Design/Definition-and-Overview/Definition-and-overview.html> (Accessed: 7.9.21)

Grudin, Jonathan. (2009). *AI and HCI: Two Fields Divided by a Common Focus*
Association for the Advancement of Artificial Intelligence.

IBM. (2020) *What is Artificial Intelligence?* Available at:

<https://www.ibm.com/cloud/learn/what-is-artificial-intelligence> (Accessed: 7.9.21)

Marr, Bernard. (2018) *The Key Definitions Of Artificial Intelligence (AI) That Explain Its Importance*. Available at:

<https://www.forbes.com/sites/bernardmarr/2018/02/14/the-key-definitions-of-artificial-intelligence-ai-that-explain-its-importance/?sh=5c1fb9124f5d> (Accessed: 7.9.21)

McCarthy, John. (2004) *What is Artificial Intelligence?* Available at:

https://homes.di.unimi.it/borghese/Teaching/AdvancedIntelligentSystems/Old/IntelligentSystems_2008_2009/Old/IntelligentSystems_2005_2006/Documents/Symbolic/04_McCarthy_what_isai.pdf (Accessed: 7.9.21)

Paine, Chris. (2018) *Do you trust this computer?* [Documentary]

Store Norske Leksikon. (n.d) *Karel Čapek*. Available at:
https://snl.no/Karel_%C4%8Capek (Accessed: 7.9.21)

Verne, Guri. (2020) *Adapting to a Robot: Adapting Gardening and the Garden to fit a Robot Lawn Mower*.