Individual assignment 1

First iteration

Concepts, definition and history of AI and interaction with AI

The term AI has been around for decades. The term was first used f in 1956 by John McCarthy, a logician and mathematician, who sent out a call for participation in a workshop (Grudin, 2009, p. 49). McCarthy was not the only one to ponder over the possibility of computers performing tasks and behaving in ways that are characteristic of the human intellect. The logician and mathematician Alan Turing, wrote in 1949 an article published in the *London Times* where he address this exact topic (Grudin, 2009, p. 49).

If we pick out two random people from the street and ask them to define AI, it is likely that their answers will differ. Hence, it is useful to look at a couple of different definitions before we move forward. One definition of AI is that "artificial intelligence is the simulation of human intelligence processes by machines, especially computers " (Burns et al., 2021). This definition refers to the human intelligence processes, such as facial recognition and speech recognition. The Merriam-Webster dictionary defines AI in two ways. It states that artificial intelligence is "a branch of computer science dealing with the simulation of intelligent behavior in computers" and that AI is "the capability of a machine to imitate intelligent human behavior" (*Artificial Intelligence*, n.d.). To imitate intelligent human behavior means that the AI in itself does not display human behavior, instead the machine follows a set of rules on how to behave that is intended to appear as human behavior. A final definition of AI is presented by the Norwegian government in *The National Strategy for Artificial Intelligence*. Here they state that "AI systems act in the physical or digital dimension by perceiving their environment, processing and interpreting information and deciding the best action(s) to take to achieve the give goal. Some AI systems adapt their behavior by analyzing how the environment is affected by their previous actions" (Ministry of Local Government and Modernisation, 2020). Taking all these definitions of AI into consideration AI can be describes as "machines that use informational input in order to simulate human intelligence and behavior".

In *Towards a Framework for Human-Robot Interaction*, author Sebastian Thrun writes about the different kinds of robots, robot autonomy and interfaces that the different individuals of society might interact with. Thrun starts by introducing the three different kinds of robots relevant within the field of information technology. These three are industrial robots, commonly used in the automotive industry, the professional service robots, which "assist people in the pursuit of their professional goals" and finally the personal service robots, which "assist or entertain people in domestic settings or in recreational activities" (Thrun, 2004, pp. 11–12). Further, Thrun explains the different kinds of robots have different levels of autonomy. Industrial robots have the lowest level of autonomy, as their workspace is quite specific and easy to control, while professional service robots and personal service robots require a higher level of autonomy, as they work in environments where it is necessary for the robots to adapt to the unpredictability of human behavior (Thrun, 2004, pp. 14–15). Finally, Thrun looks at the different interfaces of robots, distinguishing between robots that require direct interaction, and those that require indirect interaction. This is an important distinction as the interface of a robot that can act on its own would not have the same requirements as a robot that needs to be operated by a person. All in all, I found this a well written and easy to understand article. I do wish that Thrun would have written another section on the consequences and effects of choosing one type of interface over another as I find this topic quite interesting, but that is more of a personal preference than a critique on the quality of the article.

One contemporary company that is well established within the field of AI is Microsoft, with their Microsoft Azure platform. Microsoft presents AI as a research area, focusing on "pursuing computing advances to create intelligent machines that complement human reasoning to augment and enrich our experience and competencies" (Microsoft, n.d.-a). Their focus is on AI as a product, and how their Azure platform is a tool for developers to create even better AI, which is reflected through the quote "Invent with purpose" (Microsoft, n.d.-b).

A documentary that goes into depth about AI and the consequences machine learning can have on society is *The Social Dilemma(2020)*. The Social Dilemma looks closer at how social media companies use the vast amount of user information available on their platforms to create detailed and deeply connected maps about their users and their interest. The companies do this to show the user the content that is most likely to promote interest and interaction from the user (Orlowski et al., 2020). It explains how all aspects of machine learning and AI that users interact with on a daily basis is constantly gathering our data. As Tristan Harris puts it, "Social media isn't a tool that's just waiting to be used. It has its own goals and it has its own means of pursuing them by using your own psychology against you" (Orlowski et al., 2020).

Robots and AI systems

The word robot long predates the current day definition of what a robot is.
Robot means "forced labor" and derives from the Czech *robota*, which appeared in the play *R.U.R.: Rossum's Universal Robots* by Karel Čapek from 1920 (Britannica, n.d.).

One definition of robot is from the Robot Institute of America, who in 1979 defined robot as "a programmable, multifunctional manipulator designed to move materials, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks" (Thrun, 2004, p. 11). This definition looks at robots being able to move elements through physical space, like serving customers in restaurants or handing a surgeon a tool in the Operating Room. Another definition of the robot is "any automatically operated machine that replaces human effort" (Britannica, n.d.). This definition is a bit broader than the previous one. It does not only look at robots performing physical human effort such as movement, but may also include speech and solving math equations, which would require mental effort. Personally, I would define robot as "an object created by humans, that can replace human tasks which require physical movement".

On one side, robots and AI are not that different. Both are man-made and can replace different human performed actions. In addition, both require written programs to know what to do and what rules to follow. On the other hand, robots and AI are as different as can be. Robots are physical and can only follow a predefined set of rules, while AI is designed to

learn from the environment that interacts with it. If the robot walks into a wall, it will continue walking into the same wall each time unless someone updates the software. If an AI is faced with a picture of a banana it will after a while recognize that these pictures have something in common.

An example of a contemporary robot is the robot vacuum cleaner. The iRobot comes with an app that lets you map the size of your rooms in your home (*IRobot Home App | IRobot*, n.d.). It also allows you to specify which areas you want to send your robot vacuum to, and which areas are so called "no-go-zones". However, if your living room has a stairwell in one corner that you have not defined, and the robot happens to fall down the stairs, it will continue to make the same mistake until the inconsistency between the actual living room, and the mapped out living room is changed.

Universal Design and AI systems

The Center for Excellence in Universal Design was established by the National Disability Authority in 2007 (*About Us | Centre for Excellence in Universal Design*, n.d.). They define Universal Design as "the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people regardless of their age, size, ability or disability" (*What Is Universal Design | Centre for Excellence in Universal Design*, n.d.). This definition means that Universal Design is design that from the beginning of the design process takes all possible user into consideration, and designs with the intention of the product being accessible to all. This stands in contrast to designing for one possible audience, and then later adapting the product to a wider audience. With respect to inclusion, I understand Universal Design as designing for the few before designing for the many. An example would be to prioritize writing descriptive code so that individuals using e-readers can access the sight, and then later making the sight visually. The aesthetic of a web page is not a criterion in order to understand its content, but clean code is necessary so that individual using an e-reader can understand and navigate the content of the web page.

AI is a promising field when it comes to inclusion. Our perception of the society around us is influenced by a bunch of different factors. For one, emotions and current mental state can fog our perception, or make us less observant. AI on the other hand will work the same every time, so while we might not notice that someone is agitated, the AI can. This is connected to the potential of AI regarding human movement. Not only can the AI recognize out emotions, it can also be able to anticipate our movements. It is not inconceivable that this kind of AI could be used to give feedback on exercise form and technique. One example of AI that does this today is the app 'Smart Baduanjin'. An app that uses AI human pose detection to give feedback to elderly on their Baduanjin practice (Au Yeung, n.d.). Lastly, AI also holds potential when it comes to human cognition. In this case, human cognition means the mental processes our minds perform every day. Such as noticing patters around us or performing repetitive tasks. One example of AI that takes use of this is IBMs Crypto Anchor Verifier. The Crypto Anchor Verifier proves the authenticity of products by using AI and optical imaging (Dillenberger, 2018).

One example of how AI can help with inclusion is that it makes content easily available to the masses. There is AI that automatically text videos, or even university lectures as they are happening. This helps people who are hard of hearing, making it easier for them to participate in aspects of society that otherwise would not be that accessible. Examples of such products are Otter.ai, sonix.ai, and OTranscribe just to name a few. Looking at this AI seems perfect, like a gift to humanity making our lives easier. However, AI also has the potential to exclude everything from opinions to certain people from our online experience. One example of this is how the algorithm behind TikTok's "For You" page suppress videos of disabled users, among others (Biddle et al., 2020). Thus, excluding them from our user experience.

Understanding the environment around us and how things are connected is important in order to comprehend and perceive our environment with as little bias as possible. I believe that understanding the meaning of something, requires knowledge of the bigger picture. In example, it might be necessary to hold knowledge about Islam in order to understand the importance of Ramadan. With this in mind, I would further argue that

machines do not understand. A machine in itself does not understand what emotions or anger means, nor does it understand culture or norms. instead, it has been trained to detect different human emotions, and behave a certain way. It is all in the code and training data.

Guideline for Human-AI interaction

The fifth of Microsoft's eighteen guidelines for human-AI interaction is to "match relevant social norms". An example of this would be when taking an English web page and making it available in Arabic. In this case it is not enough to just translate the content, you would also have to change the direction it is intended to be read. The reason for this is that Arabic is read right to left in contrast to English left to right.

Microsoft is not the only company that has defined a set of design guidelines. Jakob Nielsen defined ten broad rules of thumb for design, called the *10 Usability Heuristics for User interaction Design* (Nielsen, 2020). These are a bit different than Microsoft's guidelines. Nielsen's rules of thumb are fewer and broader than Microsoft's guidelines. That being said, Nielsen and Microsoft address all the same concerns. Both highlight that it is important for the user to be told what is happening, that the system should match the real-world norms and expectations and that information about what the system does, and how it does what it does, should be easily available.

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