

Individual assignment - Module 1 Gwendolyn Borchsenius - gwendob

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

The history of Artificial Intelligence (AI) goes way back to the 20th century. The idea of robots had been represented by figures such as *The Tin Man* in the *Wizard of the Oz* and the robot in *Metropolis*, both movies from the first half of the 20th century. Alan Turing was one of the first persons that explored AI as a mathematical concept and raised the questions why computers could not solve problems and reason in the same way as humans can (Rockwell, 2017). Turing is often being considered as the father of AI. However back then, the technological possibilities were limited and computers could not store commands, they could only execute them. The term *artificial intelligence* was first used by mathematician John McCarthy in 1956 (Grudin, 2009, p.). Even though *artificial intelligence* existed as a concept, computers were too expensive and technical underdeveloped to be able to execute these mathematical tasks. Some years later, the *Logic Theorist*, developed by Allen Newell, Cliff Shaw and Herbert Simon, was developed to imitate a human's way of problem solving. The Logic Theorist contributed immensely to AI field, as it enabled problem solving from the technological perspective for the first time in history (Rockwell, 2017).

There are many explanations that seek to define AI. Turin's idea about AI, was a machine that could learn from its own experience by training a network of artificial neurons to perform specific tasks (Copeland). Interestingly, today's AI has not changed much from Alan Turin's concept of AI. However the approach to AI has changed over the years. Whereas AI was mostly rule-based with algorithms and mathematical forms in the 20th century, the current approach is based on that the computer learns from its own experiences by processing large sets of data. Nowadays, techniques such as *Machine Learning (ML)* and *Deep Learning (DL)* are widely being used to recognise patterns in the data structures. One can therefore argue that the current AI software develops its intelligence from the data and the algorithms used for filtering the data. Nowadays algorithms, used for filtering the data, are more complex than in the 20th century and the system's behaviour can change over time as it learns more from the retrieved data (Bratteteig & Verne, 2018, p.2). Another possible, quite

simple definition is that AI aims to mimic human intelligence and rational behaviour (Bratteteig & Verne, 2018, p.2). From my point of view, AI is a field within computer science that aims to imitate human decision making and behaviour. Machines are good at handling data and computing and they have become way more efficient in executing mathematical operations and calculations than humans. However there are certain tasks such as image recognition where humans still are superior. AI tries to imitate these human thinking structures in order to reach human reasoning.

One company that works with implementing AI in the automotive industry is BMW. On the website AI is presented as *fast, efficient and reliable* (BMW, 2019). Noticeably, all the words used to describe AI on the website, awake positive emotions. One of the main focuses on the website yields automated image recognition where AI is being used to compare an image with hundreds of other images in milliseconds. The website talks about AI as a promising service, easing the tasks of employees and customers.

iHuman, a movie about the use and interaction with AI, shows how far the development of AI has come, who stands behind the development and how AI might completely revolutionize our lives in the future. However the movie also reflects the uncertainty that exists around AI and raises serious concerns about privacy and power relations. Most people do not have insight in how AI is actually going to be used and for what purposes it will be used; it could be one of the biggest achievements of human history or it could also be the beginning of constant surveillance and tracking of human behaviour. The point is that whether we are going to benefit from AI or not depends on who is going to be in charge of decision making.

2. Robots and AI systems

Originally, the word robot comes from “rabota” which means work or labour (Deloitte Digital, 2018). The term robot was first used in the playwright “Rossum’s Universal Robots” (Deloitte Digital, 2018) in 1920. However it was not before the 1960s that the first actual robot came on the market, called “Shakey”, that could navigate itself through an environment (Deloitte Digital, 2018). As automation evolved over the years, robots became more important in areas where human work was not precise enough or where the work tasks were

too dangerous to carry out for humans, such as in the automotive industry. Another interest of area concerns work where humans have failed to carry out tasks precisely due to stress, lack of sleep or distraction. This has especially raised interest in the automated and connected car driving field or high stress level jobs.

A very simple definition on a robot is provided by the Cambridge Dictionary:

“a machine controlled by a computer that is used to perform jobs automatically” (Cambridge Dictionary)

As the definition suggests, a robot is able to carry out certain tasks without direct human involvement, however controlled by a computer. The definition also implies that these specific tasks may be predetermined. In that way robots differ from AI as AI will seek to extend its neuronal network and learn from its behaviour. Another difference between robots and AI is that AI can be entirely software whilst robots normally are physical objects moving around, seeking to release human workload (Müller, 2020) . Another definition of robots describes robots as physical machines moving around, interacting with its surrounding, typically through sensors (Müller, 2020). However some robots may use AI software. Thus AI and robots as fields may also be combined. My idea of robots is that robots are programmed and produced in order to help human beings achieve bigger tasks, such as building a car or a house. The robot is not supposed to replace human work however it can support and release the workload for humans.

Singapore developed the robot dog “Spot” to encourage social distancing during the pandemic (Toh, 2020). The robot is currently being used in parks to help people keep distance from each other. When the dog locates people not holding the recommended minimum difference to each other, it politely reminds people to keep the distance for their own and other’s safety. Spot is also outfitted with cameras to estimate the total number of people in the park at a certain time. However the cameras do not track specific individuals. The dog's characteristics are similar to a real dog in the way he looks and moves around.

3. Universal Design and AI Systems

Universal design is about designing the environment in such a way that everyone regardless of their cognitive and physical abilities or impairments can be included in the society (Digitaliseringdirektoratet, 2020). In Norway Universal Design is a legal requirement for both the public and the private sector. The way I understand this definition is that Universal Design is about making ICT available for everyone, creating a society that includes everyone and thus minimising the barriers for people with impairments.

From my point of view, AI has great potential to optimise tasks and improve effectiveness in the healthcare sector. Nurses, doctors and other healthcare workers are often exposed to immense levels of stress. As human capacity for perception is limited, stressful situations may cause an overflow of information input and as a result humans can perform poorly. AI is not exposed to stress hormones, raising temperature, lack of sleep and thus may perform better in certain stressful situations. AI may also be more accurate to execute certain tasks where human's motor skills are less inaccurate, e.g. surgery.

AI has also great potential to include people in our society in the future. In the educational sector for example AI may register where students are being challenged or struggling with the curriculum. AI then could provide individually customised tasks or learning activities for these students. AI may also generally engage students to learn through digital interactive learning lessons (Ashar & Cortesi, 2018). Thus AI might play an important role in including people, both young and old in our society in the future. However if not designed carefully, AI could also exclude certain user groups. For instance, facial recognition is not working equally well for people from different religions. The newer iPhones use facial recognition to unlock the phone and authorise transactions which causes problems for people from muslim countries that use burkas to cover their faces.

The third principle of the WCAG 2.1 guidelines deals with that web content must be understandable for the users. This includes that different users understand differently and use different amounts of time to receive and understand information. I am not certain about whether you could say that a machine can understand. The way I see it, machines can interpret input. For example a programme written in python can be programmed to interpret

the user input as an int. However there are certain human actions such as emotions and gestures that are not being interpreted by a machine unless we program the machine to do so. This leads me to my conclusion that machines do not understand as humans do, however they can be trained to understand human behaviour.

4. Guideline for Human-AI-interaction

Guideline number 13 is about learning from user behaviour. Different users react and behave differently in one and the same situation. The guideline's goal is to make AI be able to recognise these human behaviours and reactions and learn from them in order to improve. By doing so, the AI software is supposed to adapt to the user's personal behaviour.

The Interaction Design Foundation (Wong, 2020) illustrates ten guidelines for interfaces and their implementation. The framework is similar to the AI-guidelines in the way that they both want to make the user as satisfied as possible with the machine or technology. They are also similar in the way that the technology is illustrated as a tool to satisfy and help the user experience a better interaction. However they differ in adapting towards the user. Once an interface is released and on the market, it is hard to make changes. The AI guidelines in contrast seek the AI software to continuously adapt and learn from the user as the software generates more data about the user's personal behaviour.

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