Individual assignment – module 1

1.1 Concepts, definition, history and interaction with AI

1.1.1 History of AI

According to Grudin (2009) the history of Artificial intelligence goes way back, starting with the established potential of computation during the second world war. After the war, Governments funded building of computers at some universities. Not far after, Alan Turning was one of the first to comment on Artificial Intelligence. Turning was a British leading code breaker, mathematician and logician, and his statements in the London Times in 1956 created a sensation: *"I do not see why [the computer] should not enter any one of the fields normally covered by the human intellect, and eventually compete on equal terms. [...]"*

The actual term *Artificial intelligence* was first used at a workshop in 1956 by John McCarthy, an American mathematician and logician. Through the following decades, the funding, interest, and development of AI had its ups and downs. Today, ordinary computers can utilize AI and machine learning through browser access to servers, and the development of AI goes on (Grudin, 2009).

1.1.2 Definitions

The first definition is by Russell & Norvig, two researchers within Participatory design. It focuses on machines being able to perform tasks with intelligence similar to a human, rather than emphasizing technical perspectives and abilities.

"A subfield of computer science aimed at specifying and making computer systems that mimic human intelligence or express rational behaviour, in the sense that the task would require human intelligence if executed by a human" by Russell & Norvig in 2010 (Bratteteig & Verne, 2018, p. 1-2)

The second definition is also focused on the 'intelligence' of machines within the field. Most importantly this intelligence must adapt to the environment and different situations in order to function properly.

"Artificial intelligence is that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment." (Stone et.al., 2016)

For the last definition, which is the most recent one, the authors from the High-Level expert group on Artificial Intelligence (2019) are elaborating a bit more about where and how systems with artificial intelligence are and can be of use:

"Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications)"

My definition of Artifictial Intelligence, based on the three mentioned, is as follows:

"Artificial Intelligence is a technological approach making machines analyse and adapt to environments and situation, take rational decisions and perform actions that normally require human intelligence."

1.1.3 Article review

For the article review I chose to the article by Dautenhahn (2018) concerning thoughts on the past and future of human-robot interaction. I found the article interesting because it addressed both the past and the future of HRI. The author expressed concern around how much robots could develop in a 50 years' time, taking the past development into consideration. To get to the point of having super intelligent robots there is a lot of time long-term and time-consuming research that needs to be done in ecologically valid environments. Dautenhahn address such work as anything but easy, yet necessary if we want HRI to have implications and social impact in the real world outside the labs.

1.1.4 A contemporary company that work with AI

For the contemporary company that uses AI I chose Apple. According to an article by Mark Allison (2021) Apple has implemented AI functions such as face, handwriting and song recognition, translation, sleep tracking and more into their software. On Apples webpage they say that AI and machine learning are building amazing experiences into every Apple product, as AI allows people to do what they never imagined. Apple is using AI while still focusing on improving user experiences and protecting user data. (Apple, 2021)

1.1.5 A film that address the use of AI and interaction between people and AI

I watched the movie "Do you trust this computer?", which discussed how the AI-industry has developed and will continue to develop further, reshaping every aspect of our lives. In the movie, self-driving cars, human replicates reading emotions, atom bombs and AI machines for surgery were some of the AI-technologies shown. A lot of positive sides of AI were mentioned, but the main characters expressed fear that machines with AI somewhere in the future could outsmart us. Self-learning machines has and will replace a lot of jobs, leading to unemployment. One of the questions I found the most interesting was expressed by one of the characters. He said that the technology will always contain parts of us, since we created it - the question is just if I will be the good or the bad parts.

1.2 Robots and AI systems

1.2.1 How the term "robot" came about

The term "Robot" has its roots back to Prague in 1920, where it was introduced in a Czech play by Karel Capek called R.U.R (*Rossum's Universal Robots).* The word itself derived from the Czech word "robota" which referred to a system of forced self labour (https://www.sciencefocus.com/future-technology/where-does-the-word-robot-come-from/)

1.2.2 Definitions

According to Thrun(2004) Robotics is a broad term. He presents two definitons of a robot, where the first definition from The Robot Institute of America in 1979 is as follows:

"A reprogrammable, multifunctional manipulator designed to move materials, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks."

The second definition is from Webster dictionary, where a robot is defined as "An automatic device that performs functions normally ascribed to humans or a machine in the form of a human."

The definitions differ in their focus. Where the first is concerned with Robots being manipulated to move certain things through programmed motions, the second focuses on it performing tasks as a human. Based on both definitions, my definition of a Robot is:

"A physical machine that is programmed to perform a series of given tasks automatically. It can be fully atonomous or semi-atonomousmay, and may be built to replicate human behaviour."

1.2.3 The relation between AI and Robots

Some of the different definitions above describing AI and robots are using similar terms, which is natural as we today can see robots with AI together with expanding technological opportunities. Even though the fields may be connected through devices capturing both terms, there are some clear differences between the two.

In my opinion, they are different in the way that AI is not necessarily a physical object, but still needs to have some kind of "intelligence" making it able to adapt to the environment and perform rational actions. This intelligence is most commonly approaching human intelligence. A robot on the other hand *is* a physical object, and the tasks performed can be preprogramed without it being adaptive, intelligent or resembling human behaviour.

1.2.4 A contemporary physical robot

For this task I would like to describe a robot that is more and more common to see in households today, saving people from the tedious task of vacuuming and cleaning. It is the robot vacuum cleaner. The robot is a lot smaller than a traditional vacuum cleaner, allowing it to easily clean under different types of furniture and stay located at a central charging station. Human can easily interact with the robot and set it to clean at convenient times. The vacuum cleaner can also be moved between floors, and will adapt by itself to different obstacles.

1.3 Universal Design and AI systems

1.3.1 Definition of universal design

"Universal Design is 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."

The definition above by the National disability authority describes Universal design as the design and composition of an environment, where I understand the environment as a broad term which also includes products, services, or buildings within that environment. The main factor of universal design is that it should benefit all, by being accessible, usable, convenient, and pleasurable for people with all kinds of different "needs". This way, universal design is *good* design.

1.3.2 The potential of AI

AI has great potential in respect to human perception, as well as emotion/cognition and movement, because AI has the ability to recognize and take action based on different situations. In the movie "Do you trust this computer?" AI was used on human replicated robots, where the AI responded to the humans talking to it based on their mood. Much research has been done with AI in robot pets (and robots) for instance to prevent elderly people from feeling lonely. Here, AI can be used to guide people feeling lost, as well as cheer them up. Also, within education, AI has great potential to increase the learning of people with disabilities. This kind of AI includes people with all needs, but there are also examples of AIs who exclude people, where for instance face-ID is has been disputed.

1.3.3 Do machines understand?

I make sense of the words "understand" and "understanding" as being able to make sense of given information. When it comes to machines being able to understand, I believe that they can understand logical information they receive, because they are programmed to, but contrary to humans they are not able to understand certain empathic perspectives.

1.4 Guidelines for Human-AI interaction

1.4.1 Microsoft's guidelines for human-AI interaction

I chose the fourth principle: "Show contextually relevant information. Display information relevant to the user's current task and environment."

This principle is based on the AI providing the user with relevant information to the user's environment and task. I also understand this principle as the AI being able to find relevant information where this is not necessarily natural. For instance, if a person is searching on Netflix for a movie, the AI should be able to suggest similar movies if the movie searched for is not available.

1.4.2 HCI principles vs Microsoft's guidelines

For the set of HCI guidelines I chose Donald Norman's six design principles: visibility, feedback, affordance, mapping, constraints, and consistency (Norman, 2013).

I believe that Microsoft's guidelines for AI are divided into phases making them easier to apply directly, whereas Norman's design principles are more abstract. Yet, they are both similar in their use of principles that such as *feedback and* visibility, which is essential regarding user-friendly interactions.

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