

## Individual assignment 1

### 1. Definitions of AI:

#### *First definition:*

In “Store Norske Leksikon”, Ivar M. Liseter describes AI as a field in computer science that uses different kinds of computer tools to study intelligent behavior and use the results from the studies to construct a system that is “intelligent”, meaning, that it is capable of solving problems and learn from experience. A system which is built to be intelligent often uses knowledge-based systems for collecting and sorting of knowledge, which is a central theme in intelligent behavior (Liseter, 2018).

#### *Second definition:*

John McCarthy writes that AI is the science and engineering behind making intelligent machines and especially intelligent computer programs. McCarthy also associates it with using machines to understand human intelligence, but that AI is not limited to methods that are biologically observable. He also defines intelligence as that part of the ability one have to reach a goal (McCarthy, 2007).

#### *Third definition:*

Michael C. Harris defines AI as the science behind building intelligent machines that can perform tasks as well as or better than humans can, and often tasks that are too complicated for the human brain. Harris also writes that AI isn't really about intelligence, but rather the task of solving problems, and that all solutions in AI is based on mathematics and computers (Harris, 2011).

### 2. Definisjoner av robotikk:

#### *First definition:*

Robotics is concerned with the study of machines that can replace humans in the execution of a task, both physical activity and decision making (Siciliano, Sciavicco & Villani, 2010).

#### *Second definition:*

Jean-Paul Laumond defines robotics as the relationship between a machine that can move where the motions are controlled by a computer, and who can interact with the real world. He also says that robots are different from automats, because motions that an automat has is mechanically determined, where computers manipulate information but don't move (Laumond, 2012).

*Third definition:*

Siciliano and Khatib refers to an definition from the 1980s, where robotics was defined as the science and technology of robots, which studies the intelligent connection between perception and action. In reference to that definition, they add that a robotic system has the ability to move in the environment (with wheels, legs, etc.) and to operate on objects present in the environment with, for instance, arms or artificial hands. They also have sensors that provide them with information about the surrounding environment and the state of the robot (Siciliano and Khatib, 2016).

**3. Definisjoner av machine learning:***First definition:*

Tidemann and Elster defines machine learning in “Store Norske Leksikon” as a specialization in artificial intelligence where they use statistical methods to teach computers how to find patterns in large amounts of data. The machine is learning instead of being programmed. They also explain how machine learning is different from AI, in a way that AI have rule-based models and ML is based on data-driven models. Rule-based models holds rules are programmed by humans before they are used, while data-driven models are not (Tidemann and Elster, 2018).

*Second definition:*

Jordan and Mitchell defines machine learning as the question of how to build computers that can improve themselves automatically through experience (Jordan and Mitchell, 2015).

*Third definition:*

Daniel Faggella combines different definitions from multiple researches to define what machine learning is. He ends up with defining machine learning as the science of getting computers to and act like humans do, and improve their learning over time automatically by feeding them with data and information from observations and interactions from the real world (Faggella, 2018).

**4. The relationship between robotics and AI as I understand it:**

I understand the relationship between robotics and AI like something physical and psychological/ cognitive. The physical part is the robot and its moveable parts like arms and wheels, etc., which can be used to interact and perform a task. I see the cognitive as its AI, the robots brain, which make it act and understand, and who learns and remembers these actions, where the information is perceived through sensors, similar to a human eyes and ears.

**5. My own definition of AI defined and explained:**

As mentioned in the previous assignment, I understand AI as something psychological/ cognitive, and specially because it's about intelligence and knowledge. Much like a human

human brain, it learns and evolves over time through interaction in the real-world and through perceiving information from it. In reference to Tidemann and Elster's definition of machine learning and the difference between AI and ML (see assignment 3), I think that, since it's based on rule-based models (Tidemann and Elster, 2018), it can't do everything yet, but rather solve and learn from tasks that it has been programmed to do.

### 6: Drawing of an interaction with AI:

I have made a drawing of an human interacting with a device that lets her understand what the cat is meowing about. I imagine that the device could understand every animal, and that it would be really useful for both pet owners and vets. The drawing is showing a cat that is not happy with the food the owner gave him, and asks/meows if he could have some salmon instead.



### 7: Read the article: "On the Subject of Objects: Four Views on Object Perception and Tool Use" by Tarja Susi / Tom Ziemke. Write in your own words one page about the different perspectives on the human relationship with tools.

In the article by Tarja Susi and Tom Ziemke, we are presented with four different aspects of the relationship and interaction between object and subject, and how a subject perceives an object; Uexküll's *functional tone*, Heidegger's *equipment*, Gibson's *affordance* and Kirsh's *entry point*.

*Functional tone - Uexküll*

Uexküll is examining the question about how we come to see what things are for, and asks the question: “*How do we know that a chair is for sitting or a cup is for drinking?*”.

Uexküll sees an object as something neutral that only becomes meaningful when an subject interacts with it, and sees an subject as an animal who lives in its own subjective universe (Umwelt). When there’s a relationship between subject and object, he sees them as a closed unit, and in this closed unit, the object assumes/ understand a *functional tone*. Which functional tone depends on the subjects current mood (Susi and Ziemke, 2005). The object gives the subject understanding of what it is and how to use it, and can be perceived different by/ in other Umwelts.

*Equipment - Heidegger*

In Heidegger’s view, the subject-object relation can only be understood in terms of being-in-the-world and he wanted to explain what it means for something to exist (Susi and Ziemke, 2005). To be and exist, one has to relate oneself to being with other beings (Susi and Ziemke, 2005). Heidegger then divide beings in to categories, being-human (subjects) and non-human being, and then divide non-human beings into two sub-categories, *Zuhandenheit* (readiness-at-hand) and *Vorhandenheit* (presence-at-hand) (Susi and Ziemke, 2005). He sees the non-human beings as tools or other things that we might encounter in our everyday lives, and here use the word *equipment* (Susi and Ziemke, 2005). To understand the objects function it has to be used by an subject.

*Affordance - Gibson*

Gibson’s view sounds similar to Heidegger’s in a way that he also sees the subject as an animal, but different because he states that it has its own niche in the physical environment (Susi and Ziemke, 2005). In Gibson’s view, what animals perceive of the environment is ambient light which reflects on surfaces that makes information available to the animal (Susi and Ziemke, 2005), information about the *affordances* or objects in the environment. The needs of the animal might change, but the affordances do not and are always there to be perceived (Susi and Ziemke, 2005).

*Entry point - Kirsh*

Kirsh use the term *entry points* about environmental structures that invites people to enter an information space, and they can be subjective or objective (Susi and Ziemke, 2005). He sees the environment as a workplace or office where things like notebooks and folders are cues in the environment (entry points) that invites us to take in/ understand information about how to use it.

**8. In detail, one of the perspectives: Entry point - Kirsh**

I’ve selected Kirsh’s perspective, *entry points*. As explained in the previous assignment, entry points are things in the environment, specifically work places like offices, that invites us to do something and gives us information about how to use it, similar to affordances.

In Kirsh's view, entry points are personal and people have different preferences when it comes to numbers of entry points (Susi and Ziemke, 2005). He uses an example of *neats* and *scruffies*, where neats keep their desk tidy and organized, and scruffies the opposite, but where both provides entry points with information about what needs to be done (Susi and Ziemke, 2005). He also states that entry points have different characteristics that affect the way people react to them, like *intrusiveness* (how much attention it attracts), *visibility*, *importance* and *relevance* (Susi and Ziemke, 2005).

**9. Select one other article from module 1, and write with your own words what this article is about.**

I have selected the article "Ironies of automation" by Lisanne Bainbridge from 1983. In the article, she discusses different ways of how automation of industrial processes may cause more problems than fixing them for the human operators, and also sees the irony in this (Bainbridge, 1983). The aim of automation is to replace the human role in control, planning and problem solving (Bainbridge, 1983), but in most cases, the new industrial systems being developed still need monitoring by humans in case of failure in the system. And because of this automation, the operators might become lazy and may not detect failure as easily as when they did it manually themselves, and in addition to this the system has alarms that let them know about detected failures (Bainbridge, 1983). Bainbridge also points out that later generations of operators of the automated systems cannot be expected to have the same skills as a former manual operator (Bainbridge, 1983).

**10. Select one documentary or a fictional film, book or game: Describe with your own words how interaction with AI is portrayed in this work:**

I've chosen the machines from the video game "Horizon Zero Dawn". The narrative is set to the future where humans live together with machines, where the machines are more like wild animals rather than pets. The machines have learned to perceive the humans as enemies that should be destroyed. They understand the difference between a human and other machines, and humans and real animals (like rabbits and foxes). They are also very sensitive to noise and movements, and will do a search by scanning the area if they think they heard something and a human is nearby.

**11. Describe what you understand by autonomy; both human autonomy and machine autonomy.**

In reference to what The European Group on Ethics in Science and New Technology states in their statement "Artificial intelligence, robotics and autonomous systems", I understand *human autonomy* as the freedom one has to set one's own standards, goals and purposes in life (The European Group on Ethics in Science and New Technology, 2018). In relation to this, I understand *machine autonomy* as the ability a machine has to operate on its own.

**12. When was the term "AI" first coined? Please make a reference.**

According to Michael C. Harris, it was the mathematician John McCarthy, together with other creative thinkers (engineers, psychologists, etc.) who first used the term “artificial intelligence” when they were brought together at a conference in 1956 (Harris, 2011).

**13. One question for the article "What we talk about when we talk about context" by Paul Dourish:**

If we can't design a system with defined requirements that fits a specific context, but rather a system that evolves as the user interacts with it in their desired environment and context, could we develop just one system that could adapt to everything?

**14. Articulate one question for any other article in the curriculum.**

Why do we continue to spend money and time on making new automated systems when it still needs monitoring by humans or replace the human completely?

## Referanser

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