

# Individual assignment IN5480 - Third iteration

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## **1. Search and find three definitions of AI, describe these briefly. Make references.**

For the following definitions I choose to first look at the definitions from Wikipedia because it is the biggest encyclopedia we have on the internet and also the first thing that comes up when one searches for these definitions on Google. It is then likely to consider that these definitions are what most people read when they try to understand what these terms are. Even though Wikipedia is not considered as the most reliable source, I thought it would be an interesting definition to look at, and compare with what we are discussing in the course.

Wikipedia defines AI as intelligence that takes place in machines and not humans or animal where you normally find natural intelligence. Beyond this they explain the research around AI as artifacts that can take actions that increases its chances of reaching their goals(Wikipedia, 2018).

Oxford dictionary explains AI as a theory and the development of computers that can perform tasks where previously demanding human intelligence(Oxford dictionary, 2018).

### **1.1 Discuss definitions relative to discussions of AI in the course.**

The definitions explains an intelligence you would normally find in humans that one now can find in computers. However, in the course we have discussed that this intelligence doesn't have to that intelligent. Følstad divides artificial intelligence in to three different categories: Artificial super intelligence, artificial general intelligence and artificial narrow intelligence. Where artificial narrow intelligence is the most common one in our society per now.

## **2. Search and find three definitions of Robotics, describe these briefly.**

Wikipedia defines Robotics as a field within engineering and sciences that also includes mechanical engineering, electronics engineering and computer science. Robotics includes information processing and computer systems as well as design, construction, operation and the actual use of robots(Wikipedia, 2018).

Oxford dictionary explains Robotics as a category within technology that concerns design, construction, operation and the application of robots (Oxford dictionary, 2018).

Nasa explains robotics as the study of robots and that robots are machines that are used to perform work. Robots are sometimes controlled by a human, and other robots can perform work on their own(May, 2017).

## **3. Search and find three definitions of Machine Learning, describe these briefly.**

Wikipedia defines machine learning as a branch of computer science, where statistical techniques are used to make the computer systems the ability to learn from data(Wikipedia, 2018).

Oxford dictionary defines machine learning as a computer capacity to learn from previous experience. Computer systems that can modify processing of new information(Oxford dictionary, 2018).

Google's own developer team describe machine learning as a system that builds or trains a predictive model from input data. (Google, 2018)

### **3.1 Discuss definitions relative to discussions of Machine Learning in the course.**

The definitions explains machines that are able to learn from data. In the course we have discussed how machine learning use neural networks to learn, and that you don't need explicit code to say what the machine is supposed to do. The definitions are a lot broader in their explanation of

machine learning, while we in the course talk about actually how you can do it.

**4. Write in three to five sentences the relationship between AI and Robotics as you understand this.**

I understand robotics as a study of robots with different abilities, where artificial intelligence is understood as a large part of these abilities. Where robotics are a major subject, I look at AI as a narrowed part of robotics.

**5. Make a text to describe your own definition of AI. Explain briefly this definition.**

Artificial intelligence is the perception of smart machines that are given abilities resembling human intelligence. These can be skills such as recognizing speech, interpreting complex content, making decisions and learning from their own mistakes.

**5.1 Expand on this text to explain the relation between AI and Machine Learning.**

Machine learning is a branch within AI, where the system is designed to learn from input data. With machine learning a computer can solve a task it's not explicitly programmed to handle. Machine learning can be used to improve the ai.

**6. Make a drawing of an interaction with an AI - something that you imagine. Describe with some sentences your drawing.**



**Fig 1:** Interacting with AI in the kitchen: the AI can helps you to use what you already have based on what you like.

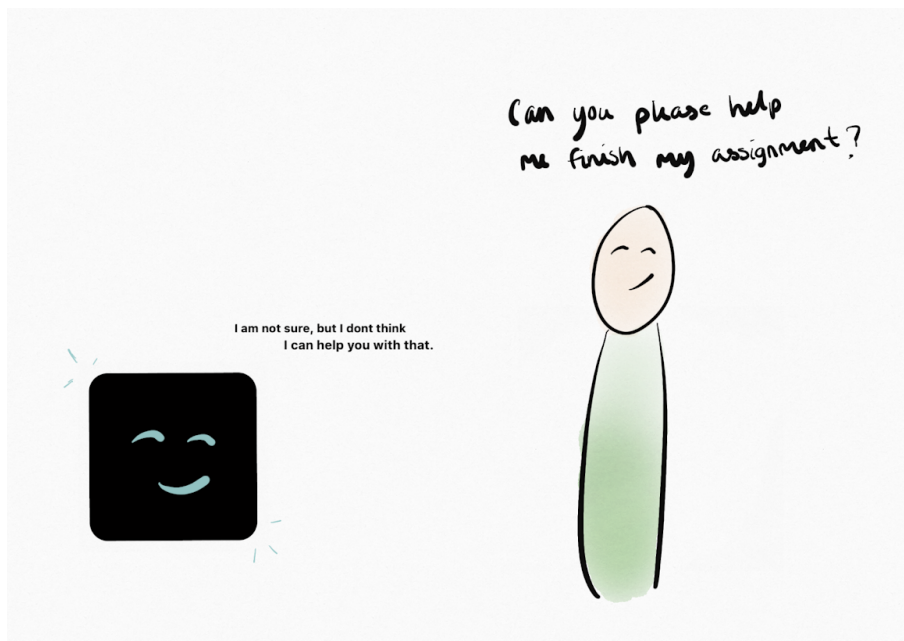
### **6.1 Summarize key characteristics of interaction design for AI-based systems (challenges, principles, trends).**

#### **Sketch a user interface illustrating one or more of these characteristics.**

In the lecture Interaction with AI - module 2 - session 2, Følstad talks about designing an AI and for it to be a good AI it needs to be as informative as required, it needs to speak/tell what it's believe is the truth, be relevant and at last be clear and unambiguous (Følstad, 2018).

He also points out that one need to design for change, uncertainty and for data capture.

### **6.2 Sketch a user interface illustrating one or more of these characteristics.**



**Fig 2:** Chatting with your conversational agent

### **7. & 8. 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.**

The article takes a look at artifacts and their environment and the relation between subject and object. It provides four different views that try to

explain this relationship. First it looks at the German biologist Jacob von Uexküll's *functional tone*, then the German philosopher Martin Heidegger's *equipment*, further on the American psychologist James J. Gibson's *affordance* and at last David Kirsh's *entry point*.

### **Functional tone**

Uexküll explains that it is you as a subject that gives meaning to an artifact based on properties such as mood and context. A chair can be something that you can sit on, or e.g. a weapon. A subject gets its meaning through its function. We can all live in the same environment but have completely different experiences of the environment.

### **Equipment**

Heidegger explains that we can't look at subject and object as two individual entities, but that we rather should look at their relation to each other. There are different ways to look at an object, and after seeing it you can give it some kind of purpose. You can also use an object and then you might give it a new and maybe deeper meaning.

The object or tool has to fit in to the context since the context gives it meaning.

### **Affordance**

Gibson talks about the mutual relationship between subject and object. He explains that each subject lives in an own niche and set of affordances. The affordances are always in relation to the subject. We can look at the unique combination of qualities that specifies what the object can afford us.

### **Entry point**

Kirsh explains how active subjects make use of environmental structures to conduct tasks. Entry points invite you to do something, a structure or a cue that represents an invitation to enter a information room or a task. Entry points are used to achieve cognitive affordance.

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

I choose the article "Does AI make PD obsolete? Exploring challenges from Artificial Intelligence to Participatory Design" by Tone Bratteteig and Guri Verne, because I am also taking a course in participatory design this semester. The article talks about both AI and PD and that classic PD methods still can be useful in design processes, but that AI still poses some challenges. The challenges explained in the article are that the designers should be able to understand the technology they make, and that AI technology is hidden deep and one cannot foresee the effects of the design. The second challenge they talk about is for the PD participants to evaluate the design over time since AI develop differently. The last challenge they present concerns how to distinguish between normal use and training since the AI is trained while being used (Bratteteig & Verne, 2018).

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

The TV-serie 'Black Mirror' first episode in the second season portraits AI as a computer system that lets a widow speak and interact to her dead husband. The system goes through all of the digitale files of the dead person and learns to interact as he or she through analyzing all these digital footprints. The more access the system has to the digital footprints the more it can imitate the persons its analyzing. I don't want to spoil the episode, but it portraits a lot of the benefits and never the less the disadvantages with AI.

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

I understand human autonomy as ones free will and ones self independence. Machine autonomy on the other hand are machines that can operate on their own, with the ability to make decisions about its own actions without being directly influenced by an operator.

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

The term AI was first coined in 1955 by the American computer scientist John McCarthy (Childs, 2011)

**13. Articulate one question for the article "What we talk about when we talk about context" by Paul Dourish in the curriculum.**

Paul Dourish talks about two different views of context, what are the different views?

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

In the article "Does AI make PD obsolete? Exploring challenges from Artificial Intelligence to Participatory Design", Bratteteig and Verne argue that PD still is important, what are their main arguments?

**15. Read the article: "Using Artificial Intelligence to Augment Human Intelligence" by Carter & Nielsen. Summarize in your own words the article's discussion of different views on computers, and on how AI may augment human intelligence (1/2-1 page)**

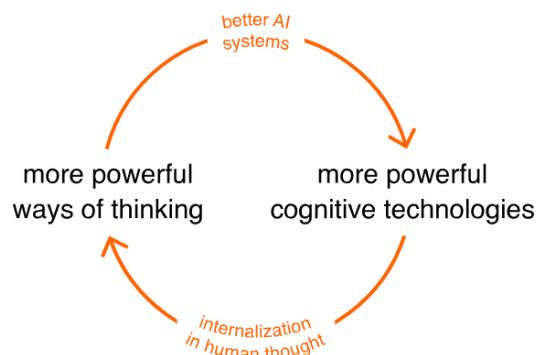
The article starts with discussing what computers are for, where Carter and Nielsen explain different views on computers. First they talk about computers as number-crunching machines that were used to perform calculations faster than humans. Further they explain a different vision for computers, conducted in the 1950-60's. Here the computers are explained as real-time interactive systems, with inputs and outputs that humans could use to expand and support their problem solving process. They call this vision intelligence augmentation (IA). Carter and Nielsen explain the difference between AI and IA like this: "IA has typically focused on building systems which put humans and machines to work together, while AI has focused on complete outsourcing of intellectual tasks to machines"(2017).

The writers introduce a new field emerging from AI and IA called Artificial Intelligence Augmentation, AIA, "the use of AI systems to help develop new methods for intelligence augmentation"(Carter & Nielsen, 2017). They use

this essay to identify broad, fundamental questions of this field.

Further they talk about how computers can expand our range of thoughts that we can think. "It's this kind of cognitive transformation model which underlies much of the deepest work on intelligence augmentation. Rather than outsourcing cognition, it's about changing the operations and representations we use to think; it's about changing the substrate of thought itself."(Carter & Nielsen, 2017). In this way, intelligence augmentation can be view as a mean to evolve the human thought and creation of new cognitive technologies. To exemplify this they refer to a font tool that can be used to discover new representations. They also refers to other tools that enables new primitives to ones thought.

Carter and Nielsen discuss that AI and computers will continue to grow and get better at problem solving, but that we as humans will remain mostly unchanged. And further that the computers possible can emulate the human brain. As a third view they describe an AI that can change humanity and help us invent cognitive technologies that can help expand the human thought. And that this knowledge can assist in developing a better AI. They use a neat figure to illustrate this:



**Fig 3:** Screenshot from Carter & Nielsen, 2017

They point out that this loop shown in the figure is extremely speculative since we don't know the future development in AI. They conclude that even though machines might outperform the human brain on most if not all cognitive tasks humans will still value the cognitive transformation that



comes along learning chess or Go since the joy you get while learning is something that the machines can't take from us.

**16. Describe with your own words what you understand by different levels of automation? What are the advantages/disadvantages related to higher/lower levels of automation? (1/2 – 1 page).**

In the ten different layers of automation, the scale starts with level one where all decisions are made by humans and in the end of the scale they have level ten where “the computers acts autonomously ignoring the human”. The most problematic thing about the higher levels of automation, especially level eight, nine and ten, is that the computer can act completely on its own. Of course this may sound swell in some cases, but one can consider it problematic when computers are let to take care of themselves, especially without the need for them to involve humans. Computers are made by humans so one can think its rationall to consider that they also should be controlled by humans. In addition, with these high levels of automation one can also consider the thought of technological singularity as a possible outcome.

The lower levels of automation on the other hand can probably serve us a lot of advantages in our daily life. If we can get help from computers to do simple tasks we will get more time to do other tasks, at least if the system works well. With the lower levels of automation the computer will not replace the human, but instead provide assistance in their work. We don't want the computers to take our jobs, but instead we can use them so we can do our jobs better.

Also, when talking about automation it's important to address what kind of technology that is being automated. If we consider a watch to be level ten on the automation scale, it will probably not cause any technological singularity. A supercomputer on level ten on other hand, could potentially be a threat.

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