Individual paper | Martin Espeland

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

The three definitions of AI that I have found are presented in the following section, with a short comment on similarities between them:

1. "It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable" ('McCarthy - WHAT IS ARTIFICIAL INTELLIGENCE.pdf', no date)
2. "Artificial intelligence (AI), the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings."(*artificial intelligence | Definition, Examples, and Applications*, no date)
3. "AI is a subfield of computer science aimed at specifying and making computer systems that mimic human intelligence or express rational behavior, in the sense that the task would require intelligence if executed by a human"(Bratteteig and Verne, 2018)

The three definitions all mentions intelligent machines in form of computers, and that AI in short can be defined as machines mimicking human behavior. While the Britannica definition and Verne & Bratteteig goes more into saying that AI is more imitations of actions or task of intelligent beings, McCarthy goes further by defining AI to not to be confined to observable tasks or methods.

In relation to the definitions we have discussed in the course, I think that they are all aligned with the discussions we have had. What they differ in is mostly that in the course we categorized AI in terms like "super", "general" and "narrow", while the definitions I found are more concrete and tries to generalize the term.

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

The three definitions of robotics that I have found are presented in the following section, with a short comment on similarities between them:

1. "Robotics; Design, construction, and use of machines (robots) to perform tasks done traditionally by human beings."(*Robotics | technology*, no date)
2. "Robotics is an interdisciplinary branch of engineering and science that includes mechanical engineering, electronics engineering, computer science, and others. Robotics deals with the design, construction, operation, and use of robots, as well as computer systems for their control, sensory feedback, and information processing." ('Robotics', 2018)
3. "The branch of technology that deals with the design, construction, operation, and application of robots." (*robotics | Definition of robotics in English by Oxford Dictionaries*, no date)

The definitions I have found describe robotics in general as the process surrounding designing and constructing robots to do tasks. They describe robotics to be an interdisciplinary branch of engineering, science and technology.

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

The three definitions of machine learning that I have found are presented in the following section, with a short comment on similarities between them:

1. "The capacity of a computer to learn from experience, i.e. to modify its processing on the basis of newly acquired information." (*machine learning | Definition of machine learning in English by Oxford Dictionaries*, no date)
2. "Machine learning is a field of computer science that uses statistical techniques to give computer systems the ability to "learn" (e.g., progressively improve performance on a specific task) with data, without being explicitly programmed "('Machine learning', 2018)
3. "Machine learning is a discipline focused on two interrelated questions: How can one construct computer systems that automatically improve through experience? and What are the fundamental statistical computational-information-theoretic laws that govern all learning systems, including computers, humans, and organizations?"(Jordan and Mitchell, 2015)

In brief are all the definitions I have found pointing to that machine learning can be described as statistical computing as a tool for better decision making for computers. Basically, that computers "learn" from new input.

What we discussed in the course is mostly the process of how machines learn through different layers of neurons and synapses, and through the course of iterations. This is very much inline with the definitions I have found on the subject.

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

The main bridge between the two terms are "intelligent robots" that are built and utilized with artificial intelligence. AI is in short, a computers science in which computers/machines can perform intelligent calculations, perceptions and learning actions. While robotics is more the field of how to design and construct robots, these to not have to be "intelligent". But when we build robots than are built in with the ability to perform tasks based on calculations done by AI, we are in an area that includes both fields of AI and robotics.

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

Artificial intelligence is when objects are given the ability to perform tasks that would normally require rational behavior, or mimic human intelligence, in the way it performs considerations/calculations in its actions.

By this definition I try to point out that AI can be basically everything that that can perform considerations based on rational inputs, and it is artificial in the sense that the ability is created by other beings with intelligent abilities.

While A.I can be described as the interactions of generated data, a large part of A.I consist of machine learning. A.I can in this sense be described as the executing part while machine learning are the part of A.I that takes input of data and the AI in return reacts on the new input to modify its future actions. In short, to be able to learn from experience, the AI is reliant on machine learning.

6. Make a drawing of an interaction with an AI - something that you imagine. Describe with some sentences your drawing.
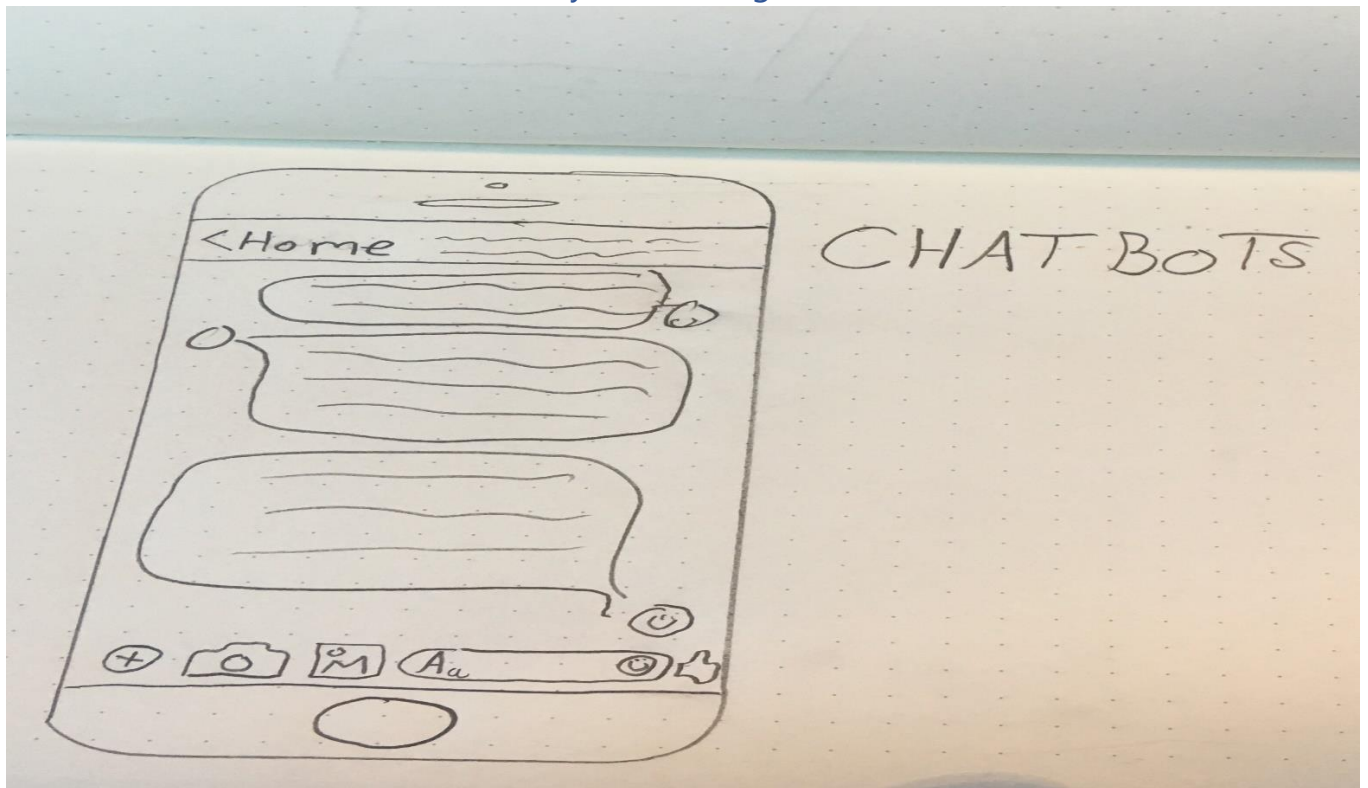
My effort to make a quite poor illustration of a chat between a human user and a chatbot that is AI based.

Key characteristics of interaction design for AI-based systems.

In Asbjørn Følstad lecture regarding "design interaction with A.I", we talked about three main concepts related to AI-based interactive system;

- Learning

- Improve

- Large data sets

These are systems that are continuously learning and improving and the background on that dataset they can train on, and input from users. By learning we also accept that the system may commit errors or be prepared for that there will be failed interactions between the users and the system.

In "Like having a really bad PA" (Luger and Sellen, 2016) they explore the gulf between expectation to interactive AI based systems and the user experience. Here they point out some important remarks on interaction design on AI, like the importance of presenting the AI systems capabilities and limitations to its users. This is to better manage expectations to the systems and improve the user experience.
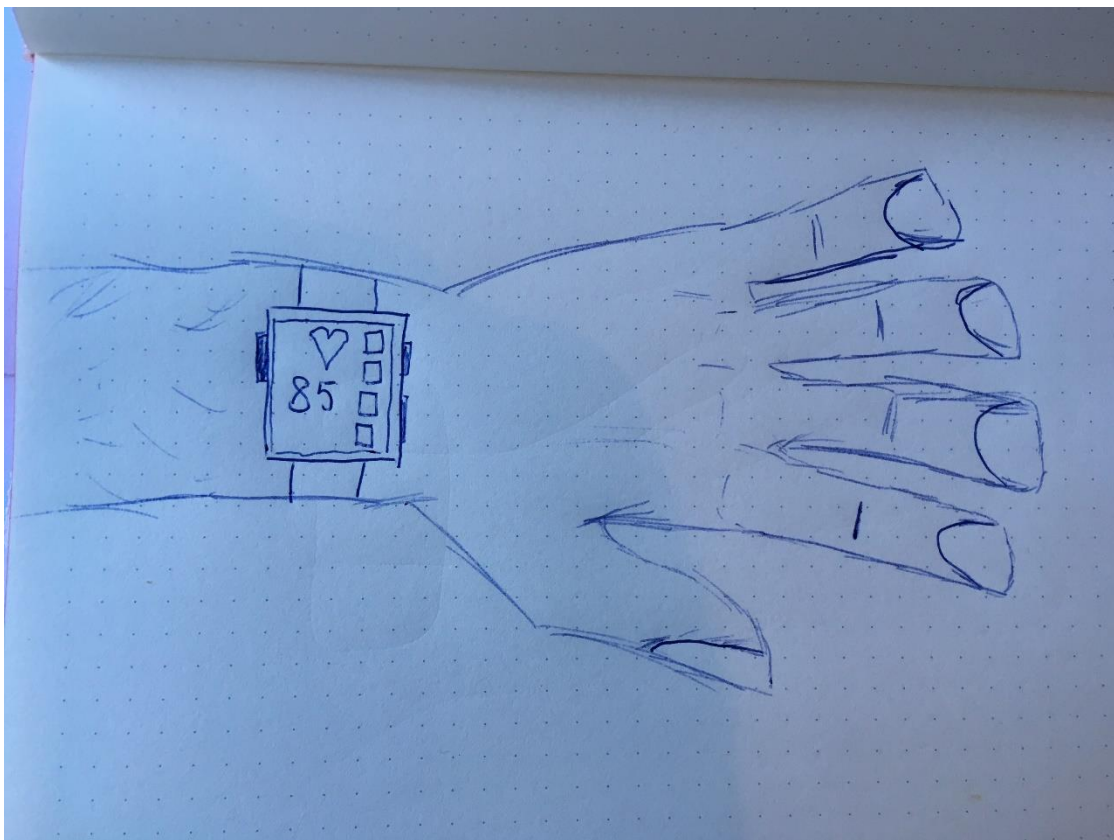

Illustration: A health tracker device. It collects data and can compare your health situation with other, and notify you when to move/exercise and give general health advices.

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.

The articles main theme is the relationship between subject and objects, this is seen through four conceptions on the matter. They each go into how subjects perceive objects and their possible use. I will present a short summary on each of the four conceptions in the order they are presented in the article:

- The functional tone

This perspective focuses on that each subject lives and perceives the world in its own image, it fits the world to its own image, and in this conception the objects that form the world are in a close relationship with the subject. Every object is in the start a neutral object to a subject, but through an iteration of "meaning circles" attributes are given to the objects and a close relationship is founded between the subject and the object. The subject has now given the object a functional tone regarding what the subject can do with the object. What kind of functional tone an object takes depends on the subjects prevailing mood, and because of this an object can have several different functional tones.

- Equipment

This conception there is an interdepended relation between subject and object, and they cannot be viewed upon as separate units. There is more focus on humans then animals as subjects and it is more emphasis on the contextual use of tools as equipment. Objects are viewed as equipment by the subjects through the subjects ongoing activities, and the object must fit into that context. It is also pointed out that neither knowledge of an object or perception of what functionality or usefulness an object has, can explain the relationship between subject and object. We need to look beyond this distinction and ask instead for what it means for a being to exist.

- Affordance

In this perspective on the subject object relationship there is focus on information about the environment, its affordances. In this view all subjects live in its own niche with its on set of affordances. These affordances are made clear in the light of which environment they appear in. As for example, objects that appear in knee height with a flat surface give it affordance to sit on by the subject. So, affordances may be called an objects property in the certain environment.

- Entry point

This concept is a theoretical framework by David Kirsh on how subjects make use of what he calls entry point or environmental objects to complete tasks. It focuses on how people can structure or change their environment and create entry points which is objects that should invite to interaction and for achieving tasks. This is mainly done to reduce cognitive stress and demands and to improve their performance, this theorical framework emphasis on the work setting.

8. Select one of the perspectives from the article and go into detail when you describe it.

I will go deeper into the concept of functional tone that was part of the work of the German biologist Jacob von Uexküll. A central point in this conception on the subject object relationship is the idea that each subject gives meaning to the physical object it encounters, it fits the world to itself, or what he calls Umwelt. The Umwelt can be described in other word to be everything that the subject perceives.

The question at hand in this conception is how can we see what objects are made for, like a chair is for sitting or a cup is for drinking? Here the concept of functional tone comes in. Uexküll meant that subjects and objects are tied together through several functional circles through which objects are being connected to the subject. He called these circles meaning circles. At first all objects are neutral to subjects, but when subjects imprint functional tones to objects and give them attributes a connection is being made. An object can have several attributes or functional tones, as for example in the article regarding the stone. When a stone lies on the ground, it can have attributes for being part of a paved road, but when being tossed it is given the functional tone of a missile.

Which functional tone an object assumes is dependent on the subjects prevailing mood and circumstances.

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

The article I selected is "Ironies of Automation" by Lisanne Bainbridge, I will go through som key points on what I understood to be the key parts of this article.

The main topic in in this paper is a discussion regarding if automation of industrial processes may increase problems rather then eliminating them, when automation is paired with human operators. It does so by showing the ironies of automation in an industrial processing plant where were tasks of human operators have been automated, and their task is reduced to monitoring and manual intervention if needed.

Further on it goes into themes like manual control skills for human operators, cognitive skills, monitoring and the operator attitudes. They are all key areas that are affected by automation in processing plant.

After the main areas are highlighted the author then goes into approaches for solutions for dealing with several of the problems that occur. The main problems that are approached are the monitoring problems that occur. Secondly the theme of working storage among human operators are discussed, this is mainly the problem that occur when human operators are not involved in on-line control and therefore do not posses the required competence when the need for a manual intervention occur. The last part of the middle section of the article goes into "Long-term knowledge". Here the problem regarding gaining competence is also an issue, and it highlights many of the problems of using simulation for training human operators for errors, especially if the potential errors are critical and unknown.

The last part of the article goes into possibilities when it comes to human-computer collaboration and how this can best be put into practice. Main themes here are on if computers should give human operators advice, mitigating human error, the use of software generated displays and the relieving of human work-load.

If sums up with a short conclusion that the types of task and environment is important when choosing to automate tasks. On key conclusion is that humans working without time-pressure can be great problem solvers, but there are larger issues when dealing with stressful situations or tasks that har a heavy time pressure. The key notion here is that classical automation may lead to more complex problems, than the problems it solves. So, we need perhaps greater technology to deal with these issues that spawns from classic automation.

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.

For this paper I have chosen the movie "Her" from 2013. The main plot in this movie is a love story between man and computer OS that has an AI as an interface. The story revolves around a man called Theodore that has problems in his marriage and social life and finds comfort in the AI based personal assistant that he has called Samantha.

The movie goes on into following the evolution of the relationship between man and machine, and it is the interaction between them that is the main story line of this movie.

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

In my understanding human autonomy is the trait of being self-going or that an individual can make decisions without the consent of others, that be humans, institutions or other authorities. In other terms it can be described as total freedom or full independence.

Machine autonomy is much like human autonomy but in this instance we as humans have given an object the ability to operate without an operator. Machines that can govern their task themselves and do not need human interaction.

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

It was coined by John McCarthy in 1956 . ('McCarthy - WHAT IS ARTIFICIAL INTELLIGENCE.pdf', no date)

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

What are the four assumptions about context that Paul Dourish mentions in the paper?

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

My question is to the paper "Does AI make PD obsolete" by Tone Bratteteig and Guri Verne, and the questions is "What are the main challenges that AI poses to PD when designing systems that should involve AI?"

15. "Like Having a Really Bad PA" (Luger and Sullen, 2016)

The article takes look upon the gap between expectation and experience in the use of conversational agents (CA) in everyday use. For creating future guidelines for designing interaction with dialogue systems, the article seeks understanding by asking two main questions. 1. What factors currently motivate and limit the ongoing use of CA in everyday life? 2. What should we consider in future design considerations.

Through several semi-structured interview with 14 users of conversational agents over the timespan of 3 months they got these key lessons for future design of interaction with dialogue systems:

1. Reveal system intelligence

A problem that were clear for all the users were the incapability to judge the capacity of options that the CA could provide to them. People with more knowledge regarding IT and technical solutions were more likely to try out and invest time in the agents. While people with lower competence often had unreasonably high expectations to the CA leading them to question the intelligence of the agents. This finding mainly pointed out the need for more design solutions for showing possibilities for interactions between the users and the CA.

2. Reconsider interactional use of humor

Even though humorous interaction are a great tool for initial interaction and for learning interaction possibilities, they set an unrealistic expectation for users. Especially for those that are not familiar with the "intelligence" of the systems. This may lead to frustration and may set a bar for failure much lower for other interactions of the CA. For this reason, the paper suggest that for future design that humorous interactions should be reconsidered or at least be designed in way that supports the user assessment of the system.

3. Show capability of the conversational agents

This problem is closely related to the first key lesson learnt, but goes more into how CA can communicate a failed interaction, and how it can again show its capabilities. Siri and Google Now that were the main CA used in this paper, mainly gives web search or general polite trigger responses for their failed interaction. This can lead to users to give up on trying to perform certain tasks, and they often blame themselves for the failed interactions with the CA. The article sums up this problem, in that there must be a reconsideration on how CA presents its limitations and capabilities better in situations where the interactions fails, and it can't be presented visually to the user.

4. Rethink system feedback and design goals

Through this study the specific use cases and context of the use of CA became clear. Mainly when the user's hands are occupied, and they are doing another main activity, driving, cooking, etc. In cases where users are required to see visual aids or results by the CA this means extra work and in some instances a feeling of a failed interaction. The CA that are studied are mainly used to provide some effect of effectiveness and usefulness, the question is then if the CA that are mostly designed today are made with

that design goal in mind. In short, do we need to reconsider the main use cases of CA today are the last key lesson learn.

The article is from 2016 and is still highly relevant for the main CA used in the paper, Siri and Google Now. Especially the points on how to set expectations through how we show limitations and capabilities are important in my mind. Regarding using humor to learn is a fun lesson learnt from this article and should be further investigated in terms on alternatives on how to use it, when and were in an interaction. For general use in interaction with AI I think all the points are relevant. They mainly base themselves on the issue of setting expectations, which are relevant for all HCI settings.

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