Individual assignment

Second iteration

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

Definition from Wikipedia: *"Artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans and other animals" (Artificial Intelligence, n.d.a).*

I think this is a rather vague definition. What kind of intelligence do we talk about here?

Definition from Oxford Dictionaries: *"The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages" (Artificial Intelligence, n.d.b).*

This definition is more on point, and easier to grasp because of examples.

Definition from Merriam-Webster:*"A branch of computer science dealing with the simulation of intelligent behavior in computers. The capability of a machine to imitate intelligent human behavior" (Artificial Intelligence, n.d.c).*

Again, what is really "intelligent behavior"? This definition need more explaining to be understandable.

The definitions do not take into account that it is us humans who train the AI, which we have been talking about in class. It is easy to think about an AIs intelligence as something it achieves on its own, or not really understand where it comes from. The definitions do not consider that the AI is evolving.

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

Definition from Merriam-Webster: *"technology dealing with the design, construction, and operation of robots in automation" (Robotics, n.d.a).*

I don't get what "in automation" means. Otherwise it is understandable and direct.

Definition from Cambridge Dictionary: *"the science of making and using robots" (Robotics, n.d.b).*

Very short and concise, but we may lose some details which the other definitions give.

Definition from Oxford Dictionaries: *"The branch of technology that deals with the design, construction, operation, and application of robots" (Robotics, n.d.c).*

Similar to the one from Merriam-Webster, but adds "application of robots". Not sure what that means.

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

Definition from Wikipedia: *"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" (Wikipedia).*

I like this definition because they briefly explain what it means when a computer "learn", and what kind of techniques that are being used to give the computer this ability.

Definition from Oxford Dictionaries: *"The capacity of a computer to learn from experience, i.e. to modify its processing on the basis of newly acquired information" (Oxford Dictionaries).*

This definition is very short. To understand this i need more information about how the computer use this newly acquired information.

Definition from Techopedia: *"Machine learning is an artificial intelligence (AI) discipline geared toward the technological development of human knowledge. Machine learning allows computers to handle new situations via analysis, self-training, observation and experience." (Techopedia)*

This definition list examples, which is good, but i do not understand what "new situations" is, or how this ability happens.

In class we have learned more about how machine learning actually works and more specifically how it is made. This is very complex and impossible to describe in just a short definition like these. After having had two classes about ML, I think i prefer the definition from Wikipedia, because it

specifies that the computer do not learn like a human does, and that it does this without specifically being programmed.

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

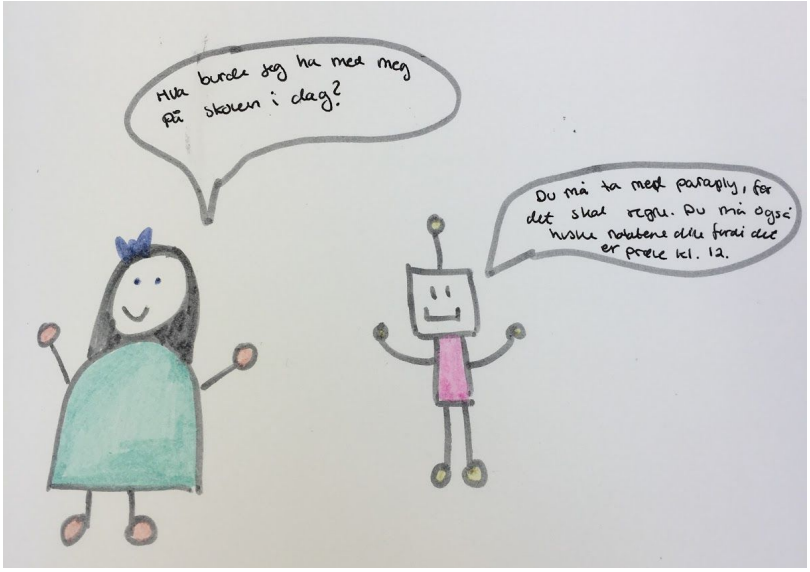
AI are in a way the inside of the computer and robotics is the outside. You can have robots without AI, AI without robots, but you can also robots with AI. If we want to make robots who seem like humans, who can act on their own, they need AI.

5. **Make a text to describe your own definition of AI. Explain briefly this definition. Expand on this text to explain the relation between AI and Machine Learning.**

AI is intelligence (within a machine) who is acquired from "learning" from huge data sets (machine learning). Machines (or robots) with AI are able to communicate with humans on their own, or solve problems for humans. Machine Learning is the way the AI gets its intelligence. It requires amongst others huge data sets the machine practices on. AIs can also learn from a lot of input where they are being thought what input is correct and what is not, as we do when creating a chatbot.

My definition focuses on how the intelligence is achieved (as I have understood it), and what AI basically are being used for.

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



I imagine that in the future we all have our own assistant, whether it is a physical robot, or a robot like Siri. This robot can do anything for us, like answer any questions, make phone calls for us, write email, write grocery list, clean our house, cut the grass etc.

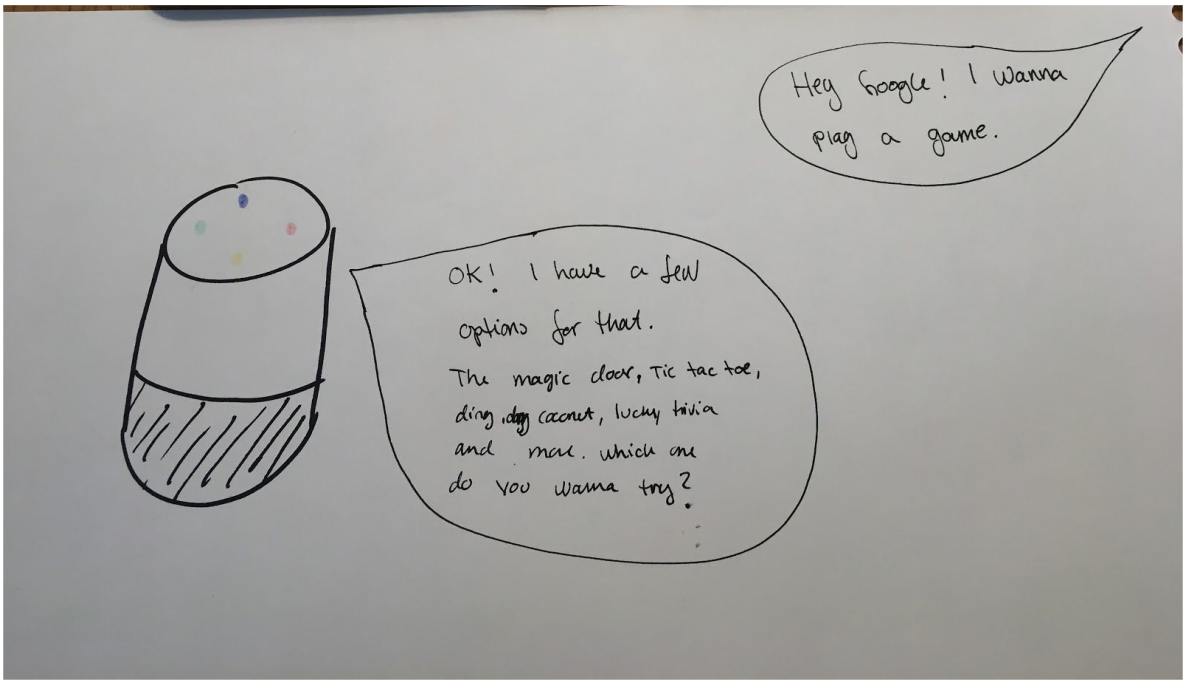
Key characteristics of interaction design for AI-based systems

1. Conversation is the object of design
2. Speech acts - we speak to perform something
3. Be as informative as required
4. Speak what you believe is the truth.
5. Be relevant
6. Be clear and unambiguous
7. The persona must be consistent
8. Conversation repair: prevent error, provide help or alternatives, if fail: do it well

Tentative design principles

- Learn
    - Design for the systems to be changing (it is learning)
    - Explain what the program does, and that change is going to happen, dynamic character
    - show capabilities - make clear to the user what you can do
    - be clear on limitations - controle expectations
- Improve
    - mistakes inevitable - design for uncertainty
        - inform about level of certainty - are the AI uncertain (this looks like glasses?)
        - make recovery easy
        - learn from mistakes (Was this useful for you? Yes/no)
- Fuelled by large data sets
    - design for data capture
    - make users benefit from data

Drawing of a user interface illustrating the AI showing capabilities and making it clear to the user what she can do:



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.**

1. **Functional tone (von Uexkull)**

This perspective is placed within theoretical biology. According to Uexkull, we all live in our own subjective universe. Objects are neutral and is only assigned meaning when a subject interacts with it.

2. **Equipment (Heidegger)**

This perspective is placed within philosophy. 'Equipment' refers to
- the thing (non-human beings)
- its usefulness (it it used to get something done)
- its context (fitting of an object into a wider context is termed *involvement* or *relevance*)

Equipment is what it is only when it is used.

There is an interdependent relation between subjects and objects. The way a tool is perceived depends on the subjects ongoing activity. The equipment has to fit into the context.

3. **Affordance (Gibson)**

This perspective is placed within psychology. What we see when we look at an object is its affordances. We perceive what it affords us. The affordance does not change as the need of the observer change, but the observer may or may not perceive the affordance.

4. **Entry point (Kirsh)**

This perspective is placed within cognitive science. Entry points invites us to do something. People create collections of entry points that say something about what is happening or what has to be done, eg. piles of paper, folders, day planners, lists etc. Entry points can be made either with a high or low degree of structure. They provide support for work tasks. There are several different characteristics to entry points:

- Intrusiveness
- Richness in metadata
- Visibility
- Freshness
- Importance
- Relevance

Kirsh's theory look at how active subjects make use of environmental structures to achieve tasks. Entry points may be objective (user independent) or subjective (user dependent).

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

Functional tone: The meaning subjects assign to an object is its "functional tone". An object can have different qualities. The example used is that a stone can have a "path-quality" when it provides support for walking on a road, or it may have a "throw-quality" when being thrown at an angry dog. These qualities does not depend on any properties of the object. Uexkull sees it as all properties of objects are perceptual cues that the subject imprints on it. Meaning that the subject gives meaning to objects. What meaning the subject assigns to the object depends on the subjects mood.

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

Toward a Framework for Human-Robot Interaction - Sebastian Thrun

The article give a description of past- and present-day robotics. It identifies three kinds of robots (industrial robots, professional service robots and personal service robots) and briefly explains the difference and some facts about use. The article then goes into robot autonomy, which is described as "a robot's ability to accommodate variations in its environment". We have to take into consideration the degree of a robots autonomy when we study human-robot interaction. The three kinds of robots mentioned operates on different levels of autonomy.

The article then goes over to talking about human-robot interfaces, which also will differ in the various kinds of robots. We can distinguish between indirect (commands and reaction) and direct interaction (communication both ways).

The article ends with some open questions directed towards modern-day human-robot interaction.

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.**

Westworld: In this series the robots are extremely real, and hard to differentiate from humans. They are being used as props in a theme park, where people can do whatever they want with them. The humans have no respect for the robots, and a robots life is worth nothing. They are being reprogrammed for each life they live, but the AI takes over and humans lose control over the robots. They become their own individual with feelings, and are looking for revenge.

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

Autonomy to me is that you have the ability to make your own decisions. All free humans have this ability (although you have to comply with the law). As I understand machine autonomy now, it is that machines have the ability to do things automatically, based on how they have been programmed. Well developed AI could give machines the ability of autonomy more like humans . the ability to make own decisions. The decisions made then have to be based upon something, which means that machines have to have learned something before being able to make decisions.

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

The term “AI” was first coined in 1955 by John McCarthy in his proposal for the 1956 Dartmouth Conference, the first artificial intelligence conference (Childs, 2011).

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

My question is more of a reflective question in regards to AI and context:

How can we make a machine who interpret the context as presented by Dourish, and the norms (orderliness from without) that follow, and adjust its own practice accordingly?

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

Interactive Robots as Social Partners and Peer Tutors for Children: A Field Trial - Kanda, Hirano and Eaton

How did the researchers prepare the children for the interaction (except from the safety instruction)? How might they have prepared the children in a better way, to avoid that they got too high expectations in regards of interacting with the robot?

15. Read the article: "Like Having a Really Bad PA" by Luger & Sellen. Summarize in your own words key lessons learnt for interaction design with dialogue systems. Discuss the relevance of these lessons learnt for interaction with AI-based systems in general (1/2-1 page)

Concrete examples from the article:

1. People find it limiting that the CA are not able to follow up conversation.
2. CA were by many considered an entertaining/gimmicky addition to their device rather than a key application.
3. If you wanted to be a “serious” user, it requires work, like researching capabilities, testing best strategies of use, training and so on.
4. Frequent use lead to more success in use. They understood what the CA could do and practiced those interactions.
5. People use the CA when they are multitasking

6. Most started their engagement in a playful way. In most cases, this resulted in longer-termed use.
7. Beyond initial play, users became less forgiving of failure
8. People dont know its potential or what they are able to do.
9. People misses feedback
10. people with less technical knowledge put the blame for failure on themselves
11. People in general do not know if it is able to learn
12. Most people expect the CA to remember the context from previous interactions
13. People give up if the CA fail after several tries and do not trust it to do more advanced tasks like booking cinema tickets or calling someone, or when language has to be precise (like in an e-mail)
14. People want visual confirmation that complex tasks had been carried out successfully

User expectations are higher than what is possible. “The “gulfs of execution and evaluation” (Norman) says that “the degree to which the system representations can be decoded by the user into accurate expectations and intentions for use”. We want a small gulf - that will make the best user experience. To achieve that we need to provide information about state in an easy way. People who know more about computers had a smaller gulf, as they had a more developed mental model of the systems capability. People with less computer knowledge had a more of a human-human dialogue model.

There were two ways of understanding and using the system: (1) as having anthropomorphic qualities, such as understanding of context which caused unrealistic expectations, and (2) using it only for simple tasks and using limited language, which prevent meaningful CA use. Both of these approaches are problematic. As designers, we should reveal system intelligence to support the understanding of the system. Playful and humorous effects reenforce the anthropomorphic qualities and raises the expectations. It is hard for the user to assess the intelligence of the CA. In the design, we should consider how to convey system limitations and capabilities in instances other than the moment when the system has visibly failed in its task. Also, we should rethink what the design goal of current CA systems are, a this could deliver a more compelling user experience.

The article sums up what we should consider when designing CAs:

1. ways to reveal system intelligence
2. reconsidering the interactional promise made by humorous engagement
3. considering how best to indicate capability through interaction

4. rethink system feedback and design goals in light of the dominant use case

When interacting with AI based systems in general, it is also important for the user experience to have an understanding of what the system can do and what its capabilities are. We also need to control the expectations the user have to the system, no matter how AI are being used.

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).

Different levels of automation is at what level the computer is given autonomy. Sheridan and Verplank (1978) present a list of ten levels where the computer are more or less autonomous in the task being performed. At level 1, the computer offers no assistance, while at level 10, there is full automation. At level 2-5, the computer merely aids the human who makes all the decisions. At level 6-7, the computer generates options and either human or system carries out. At level 8 the human is only informed if asked, and at level 9 the human is only informed if the system decides to.

What level of automation that is fitting depends on what tasks that are being performed. There should be made a risk assessment in order to decide what will be fitting. If the machine is given to much automation, it may make humans more likely to not act, even if necessary. An example of this is automation of weapon in warfare. Are the machine supposed to ask the human to accept before it shoots, ask the human to abort or else it will shoot, or should it not ask at all, and be at level 10 - completely autonomous? This is only three of multiple solutions, and they all may lead to very different results. In this instance the results may vary between life and death of innocent people.

Other areas of use may not have as serious consequences, but there may or may not be fitting for a computer so have a high level of automation. This may be instances where there is no direct right or wrong answer, and where human assessment is necessary. Lower levels of automation gives humans more control, which is important if the stakes are high or it is hard to automate the given task. More autonomy may be given if the task is simple. We also need to remember that sometimes the computer may exceed human capacity and prevent human errors, but we may also need human evaluation in more complex instances. The best level for a task would be, in my opinion, the level where human and computer fulfill each other and they are able to cooperate in a good and sustainable way without being at risk of major errors.

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