Individuell oppgave

IN5480

Vetle Alexander Gjestang - vetleag

---

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

1. "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." Definition by Nils J. Nilsson

   This quote says AI is the efforts devoted to make an entity function intelligently in its context.
2. "AI is machines that simulates human intelligens by executing tasks that demands intelligens when done by humans." Michael Negenevitsky
   This says that we can use the qualities of a human as a judge of a machines intelligence.

3. "The field of artificial intelligence research and development in computer science uses theoretical and experimental tools to study intelligent behavior, and uses the results to program computer systems that are "intelligent" in the sense that it's able to solve problems and learn from it's experiences." from Snl
   This says that ai as a field uses results from research on intelligence to apply that knowledge when making artificially intelligent computers

   1.1 Discuss definitions relative to discussions of AI in the course.
   In the course we have been told that the AI we often hear about is not an intelligent thing, but a tool. A tool that is extremely good at seeing patterns. These tools can then be combined in ways and do seemingly- and real complex tasks. But none of the definitions above really lines exactly up with that.

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

1. Snl says robotics are "a computer controlled entity with the help of sensors can receive information from the surroundings, process it and react by taking actions according to pre-programmed rules" which is similar to AI but not robotics don't learn from mistakes.

2. Cambridge dictionary says robotics is "the science of making and using robots" witch is an broader take on the term robotics.

3. Techopedia says "Robotics is the industry related to the engineering, construction and operation of robots" witch is more focused than the cambridge definition, but still looks at the robotics field as a whole.

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

1. Techemergence says "Machine Learning is the science of getting computers to learn and act like humans do, and improve their learning over time in autonomous fashion, by feeding them data and information in the form of observations and real-world interactions" which is more similar to the AI definitions.

2. Snl says "Machine learning is a specialization in AI where statistic methods are used to make computers find patterns in big data" this says machine learning is an aspect of AI

3. Investopedia says "Machine learning is the concept that a computer program can learn and adapt to new data without human interference" which is in line with the definition by snl

   3.1 Discuss definitions relative to discussions of Machine Learning in the course.
   Snl and Investopedia is the closest to what the discussions of the course. Techemergence is stretching it a bit when they say that machine learning is to get a computer to "act like humans do".

4. Write in three to five sentences the relationship between AI and Robotics as you understand this.
Robotics is a machine. It is made from material and designed to do tasks, and its programmed to do it extremely well. Its driven by electricity. AI is the brain of this and relies on its algorithms to interpret what to do and it can do and interpret several tasks or type of tasks.
As I understand it: Robotics isn't always AI, but AI is always robotics.

5. Make a text to describe your own definition of AI. Explain briefly this definition.
AI is a robot of some kind that simulates intelligence. Intelligence itself is a subject of discussion but basically if the machine seems intelligent it is intelligent. It must have the ability to interpret human communication in a way that is natural, believable and efficient. It must be able to take in other parameters than a simple command. This could be time of day, location, person and so on, and then interpret what is most likely what the user wants to do.
   5.1 Expand on this text to explain the relation between AI and Machine Learning
   AI and Machine Learning is not the same thing. But an AI program could use machine learning to take inputs and learn what's right from wrong in the given context.

6. Make a drawing of an interaction with an AI - something that you imagine. This AI-interaction is captured when the owner of the AI wants to have an unreasonable amount of take-away pizza as he comes home late and under influence. The AI knows that oatmeal and bananas will do the same trick and gives him a clue for where to look.
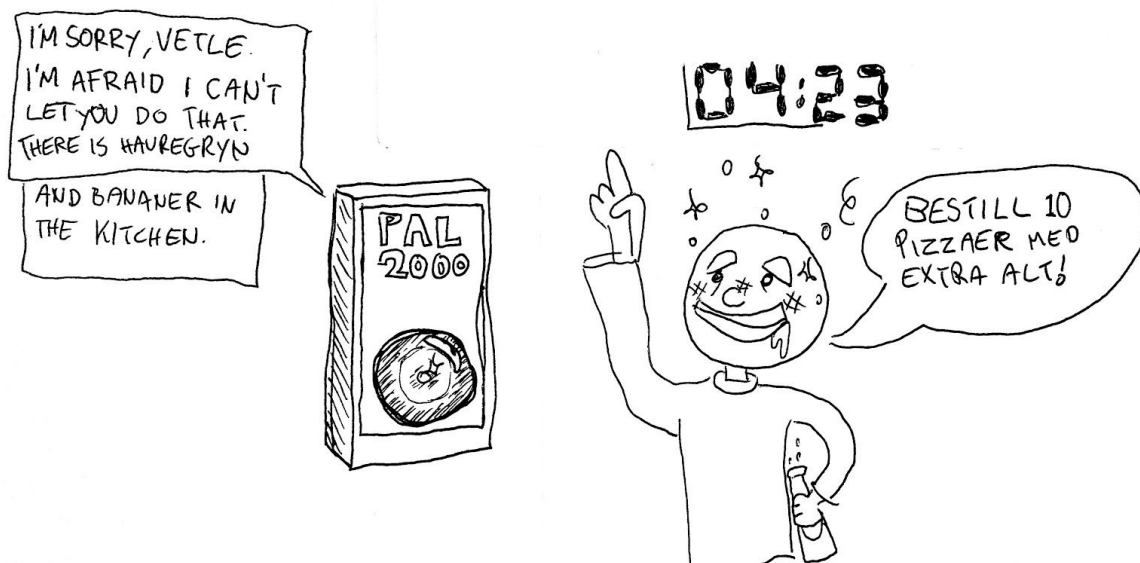
6.1 Summarize key characteristics of interaction design for AI-based systems (challenges, principles, trends). Sketch a user interface illustrating one or more of these characteristics.

The key characteristics of interaction design for AI, are the four maxims of conversation. These maxims are named maxim of quantity, quality, relation and manner.

- The maxim of quantity to only say what is needed and not give unnecessary or irrelevant information the user does not have use for.

- Maxim of quality means the AI have to say what it thinks is the truth or most likely the truth. And if it doesn't know, it should be honest about that and tell the user.

- Maxim of relation is that the information the AI provide should be what is relevant in relation to the user. It should not give me information about when Mcdonald's opens in Brazil when Im in Norway.

- Maxim of manner is that the AI has to be clear and unambiguous.

An AI should also be prepared to fail, and then it will be wise to program it to "fail gracefully". If an AI has trouble knowing what to do it should say so and try to fix the problem by letting the user alter or rephrase their question.
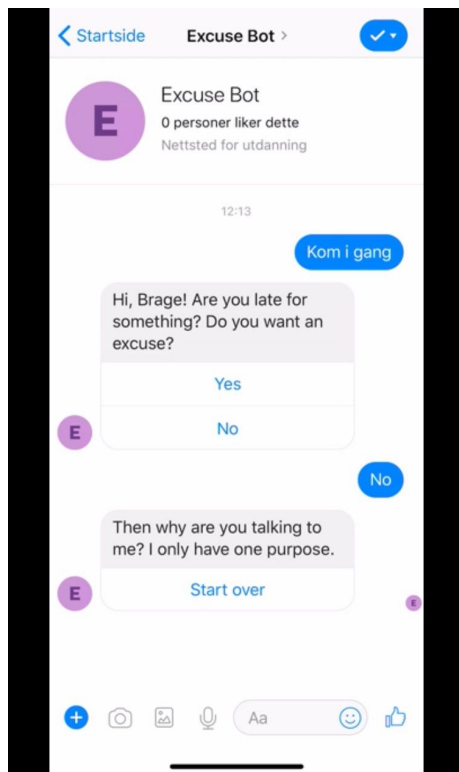
This is a picture from the group assignment where the user explores what happens when they don't want an excuse from the Excuse Bot. Since the Excuse Bot only has one function this example is our attempt of an hybrid between "fail gracefully" and the Maxim of manner.

7. Read the article: "On the Subject of Objects. Write in your own words one page about the different perspectives on the human relationship with tools.

Functional tone Jakob von Uexküll(1864-1944) have an idea that animals give physical objects meaning, and fitting the universe to their own subjective self. This subject-object interaction is termed *functional tone.* When a subject is introduced to a way of using an object the new action is manifested as an attribute, an image of functionality springs from their own action.
"…it is transformed into a meaning-carrier as soon as it enters into a relationship with a subject…Through every relationship the neutral object is transformed into a meaning-carrier, the meaning of which is imprinted upon it by a subject" (von Uexküll 1982: 27-28).
Once a subject and object has formed a relationship the attributes of the object becomes meaningful.
Subjects live in its own subjective universe where subjects and objects form a bond. An object in its self i neutral, but when a subject bonds with it - it gets a meaning. The meaning of the object depends on the subjects mood. The functionality of the object will be different when the mood of the subject. The consequence of this is that one neutral object can have many different meanings and functionalities when its in a bond with a subject.

Equipment Martin Heidegger(1889-1976) was more concerned with humans than von Uexküll's theories that concerns animals. With this social and cultural aspects enter the theories. He introduces the term Dasein which is humans specific and distinctive way of life(Snl, 2018).

The Dasein takes on itself through the involvement with people and things. Therefore the object-subject relationship can only be understood in terms of being-in-the-world. Heidegger termes non-human objects as equipment. Equipment is to be understood as something useful thing that is used in order to get something done.

"A useful thing is essentially 'something-in-order-to…'. The different kinds of 'in order to' such as serviceability, helpfulness, usability, handiness, constitute a totality of useful things. The structure of 'in order to' contains a reference of something to something" (Heidegger, 1927/1996: 64).

An object is a sum of all its traits and functions, but for an object to function it needs to be in the context of a meaningful activity. the Objects become equipment when they are put to use. An equipment is only an equipment when its picked up and used. Otherwise they do not have an inherent quality- free of context. An object shows its function when a subject can use it first hand. When its used many times the function will become at one with the object. Like a hammer is great for hammering - its also functions as a book support, but its not frequently used as this as its qualities are better for hammering.

It is an interdependent realtion between subject and object as they can not be percieved in isolation. A object and its use is depends on the subjects aktivity. Through meaningfull context an object is what it is and that context it provided og manipulated by an subject.

Affordance The view of James J. Gibson(1904-1979) is the concept of affordance. The environment consists of a set of affordances. "the affordance of anything is a specific combination of the properties of its substance and its surfaces taken with reference to an animal"

These surfaces is referring to the information that is revealed to subjects by light shining on it and making its affordance available to register.

"the affordance itself is specified in ambient light"

Subjects see an objects affordances rather than qualities. If the qualities such as shape, color or texture in itself isn't paid attention to, but rather the unique combination of qualities specifies what affordances the object presents. A flat, soft and dry surface in knee height from the ground affords as a place to sleep. Gibson differentiates between objects that are detached and those that are attached, considering detached objects can be moved around and manipulated.

This capacity to attach something to the body suggests that the boundary between the animal and the environment is not fixed at the surface of the skin but can shift. More generally it suggests that the absolute duality of 'objective' and 'subjective' is false" (Gibson 1986: 41)

Gibson states that an object's affordances does not change, but an subjects perspective of the objects affordances may change. One example is a hammer that is used to hammer in nails, but when the user needs to pull out a nail the hammer presents this affordance to the subject. But the affordance was always there. The object will offer this affordance because it is what it is.

The affordance of an object is in the object, and its the subjects perception of the objects affordances that changes. A glass door that is shut does not afford an open door, but it can be misperceived as such. A subject will then perceive its real affordance when it walks into the door. But the affordance did not change.

Affordance is the objective properties in the environment and is always there to be perceived. The subjects bodily movement is crucial for the perceptual activity.

Entry Point David Kirshs focus is with the active subject manipulating the environments structures to make it less cognitive demanding.

What people do is that they create collections of entry points that tell them what is going on, what needs to be done during the day, what needs to be taken care of the next day, and so on.

This entry points are much like affordances in the way that they invite to do something. Entry points is meant as a way to achieve cognitive affordance.

Kirsh splits this into key dimensions. The first four dimensions are objective and the two other are relative to an user.

- **Intrusiveness** means how much attraction an object demands. It can determine how mutch attention is paid to the item.
- **Richness** in metadata is how much underlying information that is presented in the entry point. The more metadata the less cognitive processes are put to use.

- **Visibility** is the visibility of an item, the higher the visibility of an entry point can determine the chance of it being used.
- **Freshness** means that a freshly used entry point is more likely to be used in a current activity.
- **Importance** like a deadline date can increase importance of the entry point
- **Relevance** is increasing the entry points probability of being used. The more relevant the higher the probability of use.

Subjects actively makes use of their environment and creates entry points to reduce cognitive demands and help to improve performance. Entry points are structures in the environment.

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

Affordance is the objects properties shown to the subject. It may tell you *how* the object can be used. An objects is what it is because of its affordances, although a subject may perceive it as something else if it sees it in a new way - the affordances was always there.

The object can be used in a completely new way and the subject find a new use or understanding for/of the object. These affordances is then discovered, but the object is a sum of its affordances. The qualities of an object can be ignored if a subject doesn't find it relevant to the activity. If color doesn't matter to the activity its ignored. Like a shoe is used for protection of feet when a subject walks outside of a indoor environment the colors of the shoes can be ignored all together. Its because it's protection that the subject is after. But when the subject wants to wear an outfit for an event that has a dress code, then the colors become a relevant factor. In both these examples colors is an affordance of the shoe to the subject. The perception of affordance depends on the subjects needs., the actual affordance does not.

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

The article is **Five Provocations for Ethical HCI Research** by Brown, B., Weilenmann, A., McMillan, D., Lampinen, A. (2016)

This article is about 5 provocations for ethics and ethical research in HCI to challenge aspects that is considered ethical.

1. Written informed consent does little to protect the participants.

An informed consent is meant to to be a safety measure for the research, but the article states that it might not be working as intended. The subject might feel like there is a risk of somehow being harmed when participating in the research. It's also not to be considered the "gold standard".

2. Intervention with vulnerable populations must result in greater benefit for them than the researchers.

The article challenges the HCI community to learn from medical research where post-trial obligations to the group that is researched. Rather than focusing mainly on the researchers results but also what good it can bring to a vulnerable community. This will also help with the pressure of participating as the population can be collaborating to the research, rather than the study intervening in their life.

3. Anonymisation should be an option, not a default.

By using the term anonymity expectations are raised for both researchers and participants of a study. Participants can be recognized by someone close to them like family and friends even with a blurred face. It's also based on the idea that participants by default want to be anonymous, which might not be the case.

4. Institutional review boards delay and damage research out of proportion to any harm they prevent.

they should be replaced. It's sometimes damaging and limiting for a study with the necessity of IRB.

Studies that could saved lives can be delayed because of the time that is used to research possible research areas. The article suggest an peer-review at two levels as an alternative.

5. Publication of research performed with, or within, a commercial entity should be blocked until the complete dataset is made available to others – both during review and for future replicability of analysis. This concerns interaction between commercial interests and research ethics. If a game company wants to conduct research for the compelling nature of their game they might not release the data of harmful gambling addiction caused by their game. That could hurt the company's interests. This can very likely result in bias in the data set.

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 film Ex Machina (2014) is about a young man who wins a coding-contest at his job and gets to see the latest in AI-tech. He discovers that its more human-like than anything the world has ever seen. It looks and moves like a human woman.
With a regular turing test this AI will most guaranteed pass. So the young man is instead meant to test if the AI has a consciousness or if it's just simulating it, even if he knows it is a machine and has been coded.
The interaction in the movie is controlled meetings through a glass, and the AI can use all 5 senses humans usually have. Although the AI has a greater capacity of almost every aspect of a human.
It is kept as a prisoner in a small room. The AI has a lot of knowledge, but everything it knows is theoretical. This is because it's a danger element if it learns about the world first hand and its maker lose control. This, to me, means that the maker of the AI also believes it has consciousness and an own will, or else would not have been a problem to let it see and learn about the real world outside.

11. Describe what you understand by autonomy; both human autonomy and machine autonomy.
What I understand by Autonomy is actions that comes from inner motivations, desires or needs. I can't find a certain definition of autonomy, but I don't believe machines can have authentic autonomy.
I believe that a machine can simulate it well or have some level of it. Like a Roomba vacuum cleaner "wants" to clean and does everything in its power (within its programming) to clean the floor and avoid obstacles. Or if a machine is coded to make it appear like it has wishes or motivations. But since machines are as per now ultimately programmed I believe that a sophisticated AI will in a way be just as autonomous as a calculator. If humans are programmed like machines, just with A, C, G and T instead of 0 and 1 - which we in a way are - I suppose what I said about the autonomy of machines must also apply to us. Before this turns into Ex-phil I'll end the question with this answer: Humans has autonomy(I believe) and machines don't - yet?

12. When was the term "AI" first coined?
It was first coined in 1956 by John McCarthy at a conference. But the open written invitation to the conference used the term Artificial Intelligence in the headline and was dated to 1955.

13. Articulate one question for the article "What we talk about when we talk about context" by Paul Dourish in the curriculum?
My question for the article: If a computer reveal its own context, should this presentation of the computers own-context also evolve with the user's learning of computers?

14. Articulate one question for any other article in the curriculum.
My questing is for Five Provocations for Ethical HCI Research by Brown, B., Weilenmann, A., McMillan, D., Lampinen, A. (2016). Can the second provocation lead to researcher favoring

vulnerable communities that is in need of something researchers want to study, and other gets left out more often?

15. Choose one of the following two tasks, a or b. a. 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)
A)
Luger & Sellen tells us about users of CA (conversational agents) and their use and thoughts about CA. In the paper we get to know some interesting lessons such as:

Some users understand the interface better than other and knows that they most likely will get a better response if they task the CA with a simple or short language. They are keeping the commands short, as they know the CA are looking for keywords.
Other users who did not have this or less of this knowledge would use more natural language and get worse results as the CA is not programmed to understand natural language

The users can be duped into thinking that the CA knows or can do more than it actually able to do because of jokes or funny remarks. When an CA tells a joke, the users will be more inclined to test what other easter eggs it can do, and that may be deceiving as the CA doesn't really have humor.

Another lesson is about feedback. Users where unsure of what potential the CA really had and didn't know what the CA could do and what tasks would be impossible.

When an user wants informating the CA would provide a link to a website as an answer. This can be a shortcut to to a search, but it will change the type of interaction from talking to the CA to using your fingers and a screen again.

The lessons in this article is very useful to have in mind when designing a CA. It's also worth to notice that skilled users think and act differently with their CA than novice users. It's also intersting to read this article with the four maxims in mind. These lessons could be very important when designing a CA that people really want to use.

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? (½ – 1 page)

Different levels of automation says something about which levels humans have to interact with a machine or system in order for it to function or carry out a task. On level 1 a machine must have a human to do all decisions for the machine to do the task. The machine does not do any auto decisions or evaluate for its next step. It just does its task. With increasing level of automation the involvement of humans will decrease in line with the levels up to 10, which is full automation. Full automation requires no human to do tasks or make decisions and in fact the machine will ignore human inquiry.

Advantages and disadvantages related to high and low levels of automation.
Disadvantages with low levels of automation is that it needs and demands input from humans to carry out tasks and decisions. This may become tiring for humans to do and may in worst case lead to the cons outweigh the pros of using it. On the highest level of automation a disadvantage could be that humans have no control over the machine and would no benefit from the machines decisions as it ignores humans. On the other hand the advantage of lower levels of automation is that humans

have control over decisions and it also can create job opportunities as it needs humans to function. Advantages of high automation is that it may make things easier for humans. As most automation today is in the middle of the scale 1-10 we can imagine level 10 to be a well functioning system of systems that makes life easier and comfortable for humans to exist in.

Litteratur:

1. Nils J. Nilsson, *The Quest for Artificial Intelligence: A History of Ideas and Achievements* (Cambridge, UK: Cambridge University Press, 2010).

2. Negnevitsky, Michael. (2011). Artificial intelligence – a guide to intelligent systems (3rd edition). England: Pearson Education Limited.

3. Liseter, Ivar M.. (2018, 20. februar). Kunstig Intelligens. I Store norske leksikon. Hentet 20. september 2018 fra https://snl.no/kunstig_intelligens.

4. Liseter, Ivar M.. (2018, 20. februar). Robot. I Store norske leksikon. Hentet 20. september 2018 fra https://snl.no/robot.

5. https://dictionary.cambridge.org/dictionary/english/robotics (Last visited: 20.09.2018)

6. https://www.techopedia.com/definition/32836/robotics (Last visited: 20.09.2018)

7. https://www.techemergence.com/what-is-machine-learning/ (Last visited: 20.09.2018)

8. Elster, Anne Cathrine & Tidemann, Axel. (2018, 20. februar). Maskinlæring. I Store norske leksikon. Hentet 20. september 2018 fra https://snl.no/maskinl%C3%A6ring (Last visited: 20.09.2018)

9. https://www.investopedia.com/terms/m/machine-learning.asp (Last visited: 20.09.2018)

10. https://courses.cs.washington.edu/courses/csep590/06au/projects/history-ai.pdf) (Last visited: 20.09.2018)

11. http://raysolomonoff.com/dartmouth/boxa/dart564props.pdf (Last visited: 20.09.2018)

Curriculum Articles:

Brown, B., Weilenmann, A., McMillan, D., Lampinen, A., 2016. Five Provocations for Ethical HCI Research, in: Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, CHI '16. ACM, New York, NY, USA, pp. 852–863. https://doi.org/10.1145/2858036.2858313

Dourish, P., 2004. What we talk about when we talk about context. Personal and ubiquitous computing 8, 19–30

Susi, T., Ziemke, T., 2005. On the Subject of Objects: Four Views on Object Perception and Tool Use. 1 3, 6–19. https://doi.org/10.31269/triplec.v3i2.19

Luger, E., & Sellen, A. (2016, May). Like having a really bad PA: the gulf between user expectation and experience of conversational agents. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (pp. 5286-5297). ACM.