

Assignment 1 – IN5480: interaction with AI's

Artificial Intelligence – definitions

1. Artificial intelligence (AI) is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans. Some of the activities computers with artificial intelligence are designed for include speech recognition, learning, planning, problem solving (“What is Artificial Intelligence - Techopedia,” n.d.)
2. In computer science AI research is defined as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals.¹¹ Colloquially, the term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other human minds, such as "learning" and "problem solving" (S. J. Russel & Norvig, 2009).
3. AI is 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 - Oxford Dictionaries,” n.d.)

Robotics - definitions

1. Robotics is the industry related to the engineering, construction and operation of robots – a broad and diverse field related to many commercial industries and consumer uses. The field of robotics generally involves looking at how any physical constructed technology system can perform a task or play a role in any interface or new technology. (“What is Robotics? - Techopedia,” n.d.)
2. The branch of technology that deals with the design, construction, operation, and application of robots (“Robotics - Oxford Dictionaries,” n.d.)
3. The field of computer science and engineering concerned with creating robots, devices that can move and react to sensory input. Robotics is one branch of artificial intelligence. Robots are now widely used in factories to perform high-precision jobs such as welding and riveting. They are also used in special situations that would be dangerous for humans -- for example, in cleaning toxic wastes or defusing bombs. Although great advances have been made in the field of robotics during the last decade, robots are still not very useful in everyday life, as they are too clumsy to perform ordinary household chores. (Beal, n.d.)

Machine learning - definitions

1. “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. Machine learning facilitates the continuous advancement of computing through exposure to new scenarios, testing and adaptation, while employing pattern and trend detection for improved decisions in subsequent (though not identical) situations. Machine learning is often confused with data mining and knowledge discovery in databases (KDD), which share a similar methodology (“What is Machine Learning? - Techopedia,” n.d.)

2. Machine learning is the capacity of a computer to learn from experience, i.e. to modify its processing on the basis of newly acquired information (“Machine Learning - Oxford Dictionaries,” n.d.).
3. 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 (Faggella, 2016).

My understanding of the relationship between AI and Robotics.

If I envision an AI as a human being, the AI would be the “person” - the persona, tone-of-voice, the entirety of the artificial being. The robot, or physical representation, is the “body”. Machine learning is “the brain” - it determines how the AI thinks, learns and creates solutions to problems.

The field of Artificial Intelligence is very broad, but its focal goal is to develop technology that can mimic complex human physical and cognitive functions. Robotics is a sub-branch of AI, mainly concerned with how the physical manifestations of artificial intelligence can be designed to react its environment and context of use. Machine learning is what improves the “cognition” of the AI. It does this through acquiring information and making inferences so that it can act more autonomously - it is how the AI acquires *knowledge*.

My definition of AI

My definition is the following: AI is a field of research in which the goal is to make the ultimate trans-human - like the terminator only not terrifying. In short, in building AIs we seem not only to want to replicate, but also improve, parts of the human physicality and cognition. Hence, when building AIs we take elements of human functions, digitize it and then try to optimize it.

Drawing



This picture is of a voice interface to which children can ask questions about the air. My master thesis concerns air quality and designing with children and this is one of the ideas we are playing around with.

On the Subject of Objects: Four Views on Object Perception and Tool Use"

This article describes four perspectives on how objects are understood and used by people. Pertaining to the field of technology design this is relevant because it examines how people and artefacts relate to one another, and how different uses of artefacts originate. Furthermore, it critically examines how we can design something to convey its range of use and functionality. Is it possible to convey functionality just by design, or do the user need to build a relationship with the object before its usage “reveals” itself? Furthermore, it is interesting in relation to the construction of AI because we might want to build robots that make use of other objects as tools. How are robots to learn to use other objects if not taught it beforehand, and how are robots to make sense of the environments they are places within?

The four perspectives the authors account for is *functional tone*, *equipment*, *affordances*, and *entry point*. They try to convey these different views by discussing whether a certain type of usage emerge from the attributes of the object itself, from people’s perception of the object in question, through the context of use, or a combination of these. The four perspectives discussed converge on some aspects but differ on others. Uexküll contends that the object itself is neutral, and that the usefulness and meaning of the object only appears when brought into a relationship with a subject. Depending on how the object is perceived by the subject (receptor image), in addition to an effector image, the object takes on a *functional tone*. The meaning or function attributed to the object is subjective and may change according to the users need or mood. Heidegger talks about objects as *equipment* and argues

that an object only becomes useful when embedded as part of an activity. Hence, the object is part of a contextual and equipmental whole. It is only when used for something that the functionality of the object emerges. Gibson talks about *affordances* as qualities in an object that invites certain types of usages. The properties of the artefact are objective and invariant. Whether they are discovered or not is closely connected to the bodily movements of the subject. Lastly, Kirsh concept of *entry points* is closely related to that of *affordances* but refers to externalised structures that indicate cognitive affordances. These entry points invite a person to engage in a specific activity and externalises cues to decrease a person's cognitive load.

The authors examine several other aspects of the subject-object relationship, including the role of social norms and knowledge, the neutrality of objects, the role of the body, context dependence, the subject-object dichotomization, the distinction between the physical environment and the perceptual world, and the agent-environment relationship.

Functional tone – Jakob von Uexküll

The perspective of *functional tone* is attributed to Jakob von Uexküll who contends that how an object is utilised is largely dependent upon the subject, and that the object itself is initially neutral. The object obtains meaning by being brought into a relation with a subject. When a connection between the subject and the object is established, the object can take on several different *functional tones*, i.e. it can be used in different manners. The objects form is constant, and consequently it is the subject's *mood* that determines whether an object such as a glass is used for drinking liquids, as a container for flowers, or for trapping spiders. If a subject is unable to attribute meaning to the object it is discarded. To me, this perspective resembles the theoretical approach of constructivism found within the field of Science and Technology Studies and explains how one technology might be used in different ways by different people.

“Interactive Robots as Social Partners and Peer Tutors for children: A field trial” - a short recap.

Kanda, Hirano, Eaton and Ishiguro examine how robots should be designed so that people form lasting relationships with them. They detail findings from a trial where they deployed an interactive robot in a classroom. The robot's purpose was to make the children practice their English skills. They stress that for human-robot relationships to emerge, the robot must inhabit some basic social skills and should have the ability to learn so that the relationship have a natural progression. This is important because we want the robot to be interesting to its users after it has lost its novelty. The robots should have the ability to recognize people, have a proper range of interaction skills, and adequate language skills. The authors also discuss the advantages of humanoid robots in the process of building lasting relations. They also stress the fact that real-world environments are very different from laboratory settings. Thus, the robot's ability to “sense” and take in complex dynamic environments is imperative for its success.

AI in movies - HER

In the movie HER, the AI is an operative system with a voice interface that sounds and acts just like a normal human being. It initially behaves like a friend who empathizes and cares about its user. The protagonist, a rather lonely and awkward man, ends up developing a friendship and ultimately starts a romantic relationship with the AI. He brings his “girlfriend” on trips, they hang out with his friends (she participates through his phone), and they have (phone)sex. Except for the fact that the AI has no tangible body the relationship seems like every other relationship, full of emotional interactions, laughter and disagreements. The AI is always there, ready to help whenever the user needs it.

This movie made me reflect upon several ethical dilemmas such as if we should design AI's to behave exactly like human beings. The AI in this movie is made to anticipate and fulfil the protagonist's every need. The AI adapts its behaviour to a person and knows exactly what to say and do in every situation. To me, this resembles manipulation. The AI is portrayed in a way that makes you think that it empathizes and feels just like a human, however, it eventually becomes apparent that this is not entirely true. If a commercial company can literally make you fall in love with its operative interface, that takes customer loyalty to another level entirely. Furthermore, when an AI can choose to simulate develop a relationship with its users, the ethical boundaries become profoundly blurred.

How I understand autonomy

I understand human autonomy as independence or the freedom to make your own choices without other actants asserting control over your behaviour. People most often make choices or act based on motivation and intent, they want to accomplish something specific, and autonomy is when you have the freedom to make this choice. There are limits to human autonomy and people are restricted by societal, religious and cultural structures. Machines are autonomous when they can act without direct influence or manipulation by human agents. However, machines are programmed by people, and so they are predisposed and limited to certain types of behaviours.

The “term” Artificial Intelligence

It was John McCarthy that first used the term Artificial Intelligence in 1955 in relation to a conference he held on the subject (M. Russel, 2011).

Question for "What we talk about when we talk about context" by Paul Dourish.

If context is always subjective and dependent upon situation and other dynamic properties, it cannot be fully defined or anticipated. How then, are we to design for what we call “context of use” beyond flexibility?

Do technologies influence context as much as context influence technologies? Is there a reciprocal relationship between the two?

Paul Dourish claims that practice is the lens through which we can resolve the problems of context. If this is the case, what then of technologies that are designed for ludic activities or activities that are not a part of a particular practice?

Question – “Toward a framework for Human-Robot Interaction”

In what ways can robots manage the user’s expectations of its range of abilities?

How do we decide what degree of autonomy a robot should have? Furthermore, how does the need for autonomy relate to the desire for predictability in devices people bring into their home?

Is it possible for a robot to develop a personality as it learns more and interacts more with people?

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