IN5480 - Specialization in Research in Design of IT

Individual assignment fall 2020

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1 Module one

This individual assignment is divided into four sections, where the first section defines the concept and history of AI. Then write about the word Robot and also discuss the relation between AI and Robots. Furthermore we will find and describe the definition of Universal Design and for the last section describe one of 18 guidelines from Microsoft.

1.1 Concepts, definition and history of AI and interaction with AI

1.1.1 How AI came about

The first use of the term AI, or Artificial intelligence, was first used in 1956 by an American mathematician and logician John McCarthy (Grudin, 2009:49). McCarthy brought together a group of leading researchers from different disciplines (mathematicians, psychologists and social scientists) to a workshop which was hosted by the Macy Foundation. The participant's optimistic forecasts attracted considerable attention.

1.1.2 Three definitions of AI

Definition 1:
"The theory and development for computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages." - (Oxford Reference, 2020)

This definition focuses on the technical ability to do human-like tasks, such as visual perception. The Oxford Dictionary defines AI as more a theoretical and practical framework, and due to the website it is hard to find out which date this definition was explained.

Definition 2:
"AI is a subfield of computer science aimed at specifying and making computer systems that mimic human intelligence or express rational behaviour, in the sense that the task would require intelligence if executed by a human." - (Bratteteig & Verne, 2018:1-2)

This definition focuses on how the AI mimics human intelligence, as well as providing a difference between human and machine intelligence. Bratteteig and Verne har two researchers from the DESIGN group at IFI, they focused on participatory design and user-centered processes. Since the article was from 2018, the definition was quite recent.

Definition 3:
"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, 2007)

This definition was first used in a workshop held in 1956, by John McCarthy, which was also the first definition of Artificial Intelligence. This definition focuses more on how AI is a science to make intelligent machines to understand human intelligence, rather than acting like a human being.

1.1.3 Make one definition for AI

My definition:

"Artificial Intelligence (AI) are machines using computer science designed to learn from their experience, make decisions, adjust or perform human-like tasks."

To this definition I wanted to focus on how AI gives computers and machines the ability to "think", which gives them the ability to perform human-like tasks including cognitive abilities. I also wanted to pinpoint that AI were designed using computer science to be able to perform like they do. It has to be made by humans to be able to think like a human.

1.1.4 A company that works with AI

PwC

The company I chose for this task is PwC and how they present artificial intelligence on their websites. PwC presents AI as a definition that gaps the several tasks of the computer. In how great they may perform the tasks (weak AI), for example to identify the contents of a car, and a more general description of AI which is their ability to learn from their experience. One of the examples they use is the "Google DeepMind", which is a project that has a goal to program general AI. Moreover PwC explains how AI can affect you and your business. Here they are giving examples on which field the use of AI will be more effective than others. Within the transport field they use weak AI, for example Tesla, to gather information about the driving patterns of a car. Furthermore PwC also informs us about which tasks AI will replace and which gender this will affect the most (PwC, 2020).

1.1.5 The use and interaction with AI

Avengers: Age of Ultron

This movie is a sequel of The Avengers where the Avengers fight Ultron, an artificial intelligence obsessed with causing human extinction. As we learn about AI in this subject we can understand and notice the increased presence of AI and how science and engineering can have the potential of improving our lives - which can also destroy us. At least in this movie, the theme of *Avengers: Age of Utron* is an excellent example of how AI has gone really bad. One of the main characters Tony Stark creates a deadly autonomous robot getting ready for war, but Ultron's intelligence seeks to take over humans who created it. Ultron is built with a "normal" robot-like body with superhuman strength, speed and reflexes. The problem here is that iterations of Ultron consciousness were self-created. Meaning that for each time he was getting stronger og smarter, fulfilling two main desires, which was bringing peace and order to the universe. With this goal in mind Ultron's move was to eliminate all other intelligences. Throughout this movie we can see how wonderful AI can be, but also considering the possibility of how it also can go rogue.

1.2 Robots and AI systems

1.2.1 How the word Robot came about

The first use of the word *robot* was by a Czech playwright, novelist and journalist Karel Čapek introduced in one of his plays in 1920, Rossum's Universal Robots (R.U.R). The word robot is from an old Church Slavoni word, *robota*, which was translated to "forced labor" (Science Friday, 2020).

1.2.2 Two definitions of Robot

Definition 1:
"Any device for performing computational or physical tasks automatically. For example, in computing, a robot is a program that trawls the Web for information, indexing it, say, for a search…" (Oxford Reference, 2020)

This definition focuses on how robots are programmed to perform automation of machines. It also mentions that a robot could be any device, which I presume is a technical device.

Definition 2:
"A reprogrammable, multifunctional manipulator designed to move materials, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks". (Thrun, 2004:11)

This definition focuses on all the different tasks a robot is programmed to perform. Here it is clearly that a robot is reprogrammable, which means that it may unlearn the tasks it has already learned earlier.

1.2.3 Make one definition for Robot

My definition
"A robot is a machine that is capable of working automatically and executing one or more specific tasks. It may replace human effort, but it does not resemble humans in appearance."

This definition focuses on how robots are able to perform automatic tasks that are humanlike functions. Robots are programmed to do one or more specified tasks with various programmed motions that can resemble a human, but it does not need to look like one.

1.2.4 The relation between AI and Robots

The idea of a robot is to do complex tasks, while an AI can simulate the human intelligence. A robot can most likely be hardware like a physical machine, and work as a tool. AI is quite the opposite, it can be a software that is able to understand, learn and reason. Robots are not able to learn something by themselves, but are programmed to do something specific.

1.2.5 A physical robot

ASIMO

ASIMO (Advanced Step in Innovation Mobility) is a humanoid robot developed by Honda with the goal to develop robots that are able to be useful to people. It is capable of moving and performing different humanlike taks without human operation. The coordination between the visual and sensors enables ASIMO to recognize faces and voices, and therefore it can recognize different people who are talking simultaneously. By its physical appearance, it is able to walk, run, run backwards, and hop on one or two legs. Because of its size, which is 130cm, it has become more flexible and is capable of adapting to changing external situations. ASIMO is also able to pour a drink or speak in sign language to communicate with people with hearing problems (Honda, 2020).

1.3 Universal Design and AI systems

1.3.1 Definition of Universal Design

Definition:
"Universal design is design that's usable by all people, to the greatest extent possible, without the need for adaptation or specialized design." (The Universal Design Project, 2020)

This definition focuses on how the design of something should be understandable for everyone, or even better. The design is making sure that it is functional for people with any type of impairment of the body or the mind. It should not give the impression of being specialized to someone with a disability. The core of universal design is to be able to adapt to changes (The Universal Design Project, 2020).

1.3.2 The potential of AI with respect to human

AI has a great potential in universal design. Seeing AI is an example on how we can include technology to people with visual impairment. This app has the ability to read printed text; object or obstacle recognition and labeling utilities. One of the reasons why Seeing AI has a lot of good press is because it combines the features mentioned in one app. As well as it is for free and anyone with Android can download it (VisionAware, 2020).

1.3.3 The potential of AI for people, including or excluding?

Face recognition can be extremely useful for people and society, therefore the technology needs to be developed thoughtfully and responsibly. For example, we now have smartphones with face recognition to open our phones instead of using a password. Face authentication gives us the feeling that it is made safer and more secure (Google AI, 2020). There are many concerns to worry about. Face recognition needs to be fair nevertheless, so it does not reinforce biases, but is this always the case? It seems like human bias can sneak into the AI systems. A study found that African American and Latino were discriminated against by the mortgage algorithm. It is said to be good at recognizing white people, but not black faces. Therefore AI should be developed well enough not to exclude people (Vox, 2020).

1.3.4 Do machines understand?

The concept of to "understand" and "understanding" something in technology depends on how you interpret what different "things" do. And by things I mean if it is a software like an AI, or something physical like a robot. For example, AI has now the ability to speech recognition, translation, object recognition, and face recognition, which is a lot of human-like tasks in general. As I mentioned earlier in this assignment AI can learn, reason and "think", but it can not predict scenarios like humans can. As for machines and robots they can learn certain things and perform certain actions, but they can not perform beyond that or reason like we do. For the human brain, to understand is the ability to reflect your actions and change your behaviour dependent on the scenario or the other person. Therefore I will say that machines can understand, but to some degree, only if they have learned every scenario and contexts possible.

1.4 Guideline for Human-AI interaction

G5 - Match relevant social norms
Ensure the experience is delivered in a way that users would expect, given their social and cultural context.

Example: [Face Recognition] "Smartphones with face authentication should apply and recognise people of any skin color."

For this section I chose Norman's Seven Principles (HCI-06129), and already from the first principle there are similarities with the one of the 18 Guidelines from Microsoft. Norman's principle tells us something about that we should use both knowledge in the world and knowledge in the head, which is quite similar to G13 to learn from user behaviour. These guidelines are used when we wish to assess the interaction between human and computers. These were the seven stages that could be used to transform difficult tasks. While the Guidelines for Human-AI are more focused on interaction with users and how to reply back to humans. They are not necessarily specified to difficult tasks, but more general tasks and performance.

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