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

The term Artificial Intelligence was coined by Stanford professor John McCarthy in 1955. He defined it as “the science and engineering of making intelligent machines”. (*Artificial Intelligence Definitions*, n.d.)

Three different definitions:

- **From UIB:** “Artificial intelligence (AI) is a common description of systems that perform actions in the physical or digital dimension by perceiving their environment, and processing and interpreting huge amounts of information and data. AI systems have the ability to adapt their behavior by analyzing how the environment and conclusions are affected by previous actions.” (*What Is Artificial Intelligence?*, n.d.)

- **From Wikipedia:** “Artificial intelligence (AI), in its broadest sense, is intelligence exhibited by machines, particularly computer systems.” (*Artificial Intelligence*, n.d.)

- **From IBM:** “Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy.” (*What Is Artificial Intelligence (AI)?*, 2024)

My definition: “AI is technology that enables computers to simulate algorithms and processes that are found in humans, such as learning, reasoning, and problem-solving.”

Both humans and machines are able to make decisions independently based on available information. Conversely, human autonomy is deeply rooted in consciousness, free will, emotions and ethical considerations, which influence decisions in complex and often unexpected ways. With a mindset of computationalism consciousness however, free will and emotions might be caused by predefined algorithms and are not what we have made it out to be.

Both concepts (automatic and autonomous) refer to processes without direct human intervention or control. In both cases a system performs tasks after being initialized often following protocols and algorithms.

The article "Intelligence on Tap: Artificial Intelligence as a New Design Material" by Lars Erik Holmquist offers a detailed exploration of the rapid advancements in AI and its implication for interaction design. He emphasizes that AI will increasingly become accessible to non-experts, likening it to “intelligence on tap”. A key part of the article is about AI´s inability to truly comprehend the world or engage in natural language conversations effectively. The article was written in 2017 and ChatGPT was released in 2022. It highlights the pace of the AI revolution, as just a few years later, we see AI models like ChatGPT capable of remarkably sophisticated natural language processing and generation.

OpenAI presents AI primarily as a platform and a service. They are now also focusing on AGI (artificial general intelligence), with the goal of creating a model that can complete the same tasks a human can. AGI might be an allconsuming new idea that will change the world drastically.

In the film “I, Robot” based on Isaac Asimov´s works, we are introduced to a world where robots are integrated in everyday life. The film explores the complex dynamics between humans and AI. One of the main points of the movie is that the more technology, AI and robots advance, the line between machine and humans may blur, leading us to question the very nature of intelligence, autonomy and humanity itself.

1.2 Robots and AI systems

The word Robot came from a Czech play called “R.U.R” as a critique of mechanization and the way it can dehumanize people. Robot comes from the word “robota”, forced labor, with it´s slavic root, “rab”, slave. (Jordan, 2019)

Definition of robot:

- “A machine that resembles a living creature in being capable of moving independently (as by walking or rolling on wheels) and performing complex actions”. (Stamper, 2024)

- “A robot is an autonomous machine capable of sensing its environment, carrying out computations to make decisions, and performing actions in the real world.” (Guizzo, 2023)

My definition: “A tangible machine that performs tasks by following predefined scripts, rules or responding to sensory input”.

A fundamental difference between robots and AI is that robots handle physical tasks, while AI handles cognitive tasks. However, both operate autonomously and can perform tasks without human control. Integrating AI into robots makes them “smarter” and more adaptable, allowing them to handle more complex tasks and learn from their environment.

Boston Dynamics Spot walks on four legs, mimicking the movement of a four-legged animal. It can perform dynamic movements such as running, jumping and navigating on uneven terrain. Spot has several use cases such as searching disaster sites for survivors, helping law enforcement officers to resolve hostage situations, assisting with drug lab investigations and even conducting structural surveys after fires. (*Spot to the Rescue*, n.d.) Human operators control Spot remotely using a tablet or a computer interface. They can direct the robot's movements, configure its sensors, and monitor live video feeds from Spot´s camera (*Spot to the Rescue*, n.d.)

1.3 Universal Design and AI systems

Definition of Universal Design from Center for Excellence in Universal Design:
“Universal Design (UD) is the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people regardless of their age, size, ability or disability. An environment (or any building, product, or service in that environment) should be designed to meet the needs of all people who wish to use it. This is not a special requirement, for the benefit of only a minority of the population. It is a fundamental condition of good design”. (*About Universal Design*, n.d.)

Universal Design focuses on creating environments and products that are available for everyone, including people with diverse abilities and needs. It is about ensuring accessibility and usability from the start.

AI has the potential to greatly enhance human capabilities in perception, movement, and cognition/emotions. For human perception, AI can improve experiences through technologies like augmented reality. For example, Microsoft HoloLense uses AI to overlay digital information onto the real world. (Roach, 2019). Another example is Apple's Vision Pro that uses AI to automatically enhance the clarity, color accuracy and overall visual appeal of images and videos. (Pogla, 2024)

In terms of movement, Companies such as German Bionic offer exoskeletons powered by AI that makes physically demanding jobs easier. Their products are worn like a backpack and provide up to 30 kg of extra force to your back, core, and legs. (Geschwindt, 2023)

For cognition and emotions, AI can aid medical health and personalize learning. Woebot is an AI chatbot designed to offer cognitive-behavioral therapy, helping users manage stress and anxiety. (*Woebot Health*, n.d.) Similarly, Duolingo employs AI to tailor language lessons to individual needs, optimizing the learning experience. (Salvador, 2023)

Potential for including: AI enables easier creation of programs that help people with disabilities communicate. Projects focusing on text to speech or speech to sign language can use AI to further develop and help their users.
Potential for exclusion: Bias in the dataset is one of the biggest challenges we are facing with AI at the moment. I will exemplify with a bizarre example: Imagine an AI software that can “see” who has arrived in class. This particular model is only trained on white people and therefore struggles to identify black students. They might then not be registered and might face challenges in the school because of this.

In my understanding the concepts of understand and understanding refer to the ability of users to comprehend and make sense of information presented to them. In human context; understand means grasping the meaning of information, instructions, or interactions. While understanding involves a deeper cognitive process where a person can integrate new information with existing knowledge, enabling meaningful interaction and decision-making.

Conversely, machines can simulate understanding by processing and responding to information, but their capabilities are not equivalent to human comprehension or cognitive understanding as of now.

1.4 Guideline for Human-AI Interaction

04 Show contextually relevant information. This guideline emphasizes the importance of presenting information that is pertinent to the user's current task and environment. An example is a driving app. The app uses AI to display real-time traffic conditions and suggest an alternative route. The app also provides relevant information, such as nearby gas stations or restaurants, based on the driver´s preferences and the current traffic situation.

I found Nielsen´s Ten Heuristic Principles. (Nielsen, 1994) Both guidelines focus on user understanding where they emphasize making information and interactions clear and understandable. For example, Nielsen's heuristic on “Visibility of System Status” aligns with the Human-AI guideline on providing clear and understandable information.

1.5 Journal - everyday engagement, interaction and use

Pen and paper
The physical act of writing with a pen felt slow but steady. My handwriting is neat at the start but becomes messier as I go along. I had to focus on forming the letters and words, which made me think more carefully about what i wanted to say before writing. It felt good to feel the pen move across the paper.

QWERTY keyboard and display
Using a keyboard to type was quick and effective. Compared to writing things down by hand, I was able to express my ideas faster. It is very simple to update, allowing me to swiftly correct errors and reorder without leaving any trace. I found that when I type, I don't always think things through as well as I did when I wrote by hand.

Speech-to-text and microphone

It felt normal to speak my ideas out loud, but it was uncomfortable when certain words or phrases were misinterpreted by the speech recognition software. I discovered that I had to talk slowly and clearly, which broke up my flow. How quickly I could "write" without using my hands at all was interesting.

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