IN5620 Individual assignment fall 2024, Thanawut Pathawanich

1.1 concepts

how the term Artificial Intelligence came about, and the history of AI. Why, how, what, when, where and by whom?

The concept of intelligence dates back to philosophers like Aristotle, who saw it as choosing the best way to achieve one's goals. Later, thinkers like Arnauld and Bernoulli added ideas of uncertainty and usefulness to decision-making. These ideas became the basis for economic theories about rational actions.

When AI research started in the 1940s and 1950s, researchers adopted the idea that intelligence is about acting rationally, meaning doing what is most likely to achieve a set goal. This standard model became the foundation of AI, focusing on creating systems that can perceive their environment and act to meet specific objectives.

In the early stages, AI development included methods like exploring multiple possible solutions and using logical rules for automated reasoning. By the 1980s, researchers started using probability theory to handle real world uncertainties, helping shape AI into what it is today (Stuart, R. 2021).

Three definitions of AI:

- Stuart Russell and Peter Norvig, in "Artificial Intelligence: A Modern Approach," define AI as "the study of agents that receive percepts from the environment and take actions that affect that environment." This widely accepted definition in AI academia and industry emphasizes creating rational agents that autonomously interact with their surroundings, focusing on adaptability and goal-oriented behavior rather than simply imitating human actions. (Stuart, R & Peter N. 2021)
- In 1956, John McCarthy defined AI as "the science and engineering of making intelligent machines, especially computer programs." This definition focuses on building machines that can solve problems, learn, and adapt, highlighting both the scientific and engineering aspect of AI. (S. L. Andresen, 202).
- AI is machines that can learn, understand, and make decisions based on the surroundings. The ability to solve problems, adapt to new situations, and function independently of human control.

Similarities and differences between human autonomy and machine autonomy:

Similarities: Both humans and machines can make decisions without someone telling them what to do. Humans use their thoughts and experiences. Machines follow their programming and react to inputs.

Both try to achieve goals. Humans set their own goals or goals for society. Machines are programmed to complete tasks set by their creators.

Differences: Humans are conscious and can think about what's right and wrong. Machines do not have awareness or feelings; they cannot understand ethics.

Humans learn and grow through experiences and interactions with others. Humans build skills like self confidence and critical thinking. Machines do not learn in the same way, they only do what they are programmed to do. Formosa, P.(2021)

Similarities between the concept of automatic and the concept of autonomous

Both automatic and autonomous systems can operate without someone controlling them directly.

Automatic systems and autonomous robots both work independently. They can either help people by doing tasks or limit their freedom by taking over decisions. Like automatic systems, autonomous robots can influence people's actions, affecting how genuine their choices are.

Select one of the articles from the curriculum. Write a brief review of this article: AI and HCI: two fields divided by a common focus:

This article discusses how Artificial Intelligence (AI) and Human-Computer Interaction (HCI) have been separate because they had different goals. AI focused on big, long-term projects needing advanced technology. HCI aimed to make widely used systems easier for people.

Because of these differences, AI and HCI often competed for resources. When AI faced setbacks during "AI winters," HCI tended to thrive.

Recently, technology has improved, and costs have decreased. This makes AI more accessible and allows it to merge with HCI. Now, AI researchers are thinking about usability, and HCI researchers are using AI techniques.

The article suggests that for both fields to succeed, they should find common goals and work together more closely.

Company that works with AI, how this company present AI on their web pages.

No Isolation is a company that creates technology to reduce loneliness among vulnerable people, like children with long-term illnesses and the elderly. On their website, they focus on how their products help people, not on Artificial Intelligence (AI).

They don’t present AI as a product, platform, or service. AI works behind the scenes in their products, but they don’t highlight it. They concentrate on practical benefits and ease of use.

On their website, No Isolation talks about the idea of using technology to bridge social gaps and connect people. They share user stories and the social issues they address. While AI might be part of their products, they don’t promote it as a separate product or service.

They include AI in their technology but mainly focus on the bigger idea of fighting loneliness through innovative tech, keeping the emphasis on people and reducing social isolation.

Select one documentary or a fictional film, book or game that is about the use and interaction with AI and interaction between people and AI.

In the Metalhead episode of Black Mirror, people are hunted by robot dogs powered by AI. These robots are relentless and cant be reasoned with, its a desperate fight to survive. The episode shows that AI can be dangerous when it operates without human control or ethics.

Its like Arthur C. Clarke’s idea that very advanced technology can seem like magic. The story warns us that while technology can do amazing things, we need to be careful. If we don’t manage it properly, it could become a threat. The episode reminds us that we must handle technology wisely to avoid unexpected dangers.

1.2 Robots and AI systems

write a section about how the word Robot came about

The word “robot” comes from the Czech word “robota,” meaning forced work or labor. It was first used by Czech writer Karel Čapek in his 1920 play called “R.U.R. (Rossum’s Universal Robots).” In this play, robots are machines created to serve humans. (A.E. Eiben, 2022)

Find two different definitions of Robot. Describe and explain these definitions.

Oxford Dictionary: “A machine capable of carrying out a complex series of actions automatically, especially one programmable by a computer.

This means a robot is a machine that can do tasks on its own, and we can program it to do different things.

Merriam-Webster: “A machine that resembles a living creature in being capable of moving independently and performing complex actions.”

This definition says a robot might look like a living thing, can move by itself, and do complicated tasks.

My Definition: A robot is a machine that can work on its own or with some guidance, programmed to do tasks, often using sensors to interact with its surroundings, to help or replace human work.

Is chatbot a robot?: a chatbot can be considered a type of robot, even though it doesn't have a physical body. It operates on its own, is programmed, and interacts with people to perform tasks, like answering questions or providing information.

Is a robot different from an AI?

According to the definitions from Ness, Stephanie, Nicki James Shepherd, and Teo Rong Xuan. (2023), robots are programmable machines designed to interact with their physical environment autonomously. They are built to perform repetitive tasks, operate in dangerous conditions, and enhance human productivity through automation.
on the other hand, AI is the technology that enables machines to exhibit human-like intelligence. This includes learning, problem-solving, decision-making, and adapting behavior based on experience. AI does not necessarily require a physical body, it can exist purely as software (e.g., chatbots, recommendation systems).

Differences: Robots have a physical form, allowing them to interact with the physical environment
AI can be software-based and may not have a tangible presence

Similarities: Both robots and AI systems can be programmed to operate autonomously. Robots use AI to enhance their adaptability and decision-making, while AI uses robotics to interact with the physical world.

Commercial robot and how a human user interacts and uses the robot in a specific situation.

AV1 by No Isolation is a robot designed to help children and young adults with long term illnesses stay connected with their school environment. The robot acts as a physical presence in the classroom for students who cannot attend due to health related issues.

How the robot moves?:
The robot is stationary and does not move around the classroom physically. It has a rotating and tilting head controlled by the child through an app on a tablet or smartphone. Using the app, the child sees and hears the classroom via AV1 camera and microphone. They can look around by moving the robots head. To communicate, they speaks into their device, and their voice comes out of the robots speaker. They can also use the robots lights to signal

things like wanting to speak. This setup allows the child to participate in lessons and interact with teachers and classmates as if they were there in person.

1.3 Universal Design and AI systems

Definition of Universal Design. Explain this definition and how you understand what Universal Design is about.

Universal design is an approach for designers to make products and services accessible and usable for the largest possible audience without the need for adaptation or specialized design. Designers use its seven principles to create a solution that can cater to as many users as possible. (IxDF, 2016)

This definition highlights making products, services, and environments that are naturally accessible and easy for everyone to use, regardless of their age, ability, or background. The main idea is to design with inclusivity from the very beginning so that as many people as possible can use the product without needing any changes or special adjustments.

Describe the potential of AI for human perception, human movement and human cognition/emotions.

AI helps interpret sensory data to improve human perception. For example, the "Hand Gesture Recognition Using 3D-CNN Model" uses a 3D Convolutional Neural Network to accurately recognize hand gestures, enabling better communication, especially for those who use sign language (A. K. Sangaiah, H. Lu and Q. Hu, 2020)

AI supports human movement by monitoring physical conditions. The "Human Arthritis Analysis in Fog Computing Environment" system uses sensors and fog computing to track limb movements in arthritis patients, providing real-time analysis and aiding doctors in efficient patient care (A. K. Sangaiah, H. Lu and Q. Hu, 2020).

Describe the potential of AI for both including and excluding people. You are encouraged to use examples

Including: AI tools like speech-to-text (Google Live Transcribe) help those with hearing impairments, while visual recognition apps (Microsoft Seeing AI) assist individuals with visual impairments by describing surroundings and reading text aloud.

Excluding: AI trained on biased data can lead to discrimination. For example, facial recognition software often misidentifies individuals.

In the WCAG 2.1 principles and in many of the Human AI-Interaction guidelines the concepts “understand” and “understanding” are used.

In WCAG 2.1, this means content should be clear and accessible for all users.
For example, videos and sounds should have text descriptions, text should have audio versions, images need alternative text, information must be structured so it can be easily interpreted by assistive technologies for example using heading tags correctly from h1 to h1 in logical order. Using colors thoughtfully in diagrams also helps convey information effectively etc.

Machines understanding is limited to following specific algorithms. They don’t have awareness, emotions, or personal experiences like humans do. They can process data and give responses, but this is just a simulation of understanding, not real comprehension.

Do machines understands?

AI cannot fully replace human insight and experience. For example, human insight may be necessary to interpret and understand the data presented by AI. We want the data presented by AI to be 100% correct, including ensuring that hearing-impaired users receive accurate transcriptions of audio and video, and that blind users receive a correct description of the content. The problem description should be accurately explained, and the deviation found by AI should not be a false positive, and vice versa. It is likely that there may be a false deviation or a deviation that has been approved by the AI tool. This is a problem because it can lead to accessibility issues being overlooked. It can be difficult to determine which problems are real and which are not.

1.4 Guideline for Human-AI Interaction

Select one of the 18 guidelines for human-AI interaction from Microsoft, and describe this guideline with a different example than what is given by Microsoft.

The guideline 03: “Time services based on context” emphasizes that AI systems should provide their services at appropriate times based on the user’s current situation, environment, or needs. This helps make interactions more seamless and less disruptive.

Consider a smart learning app designed to help students with their studies. The app uses AI to analyze the students study patterns and learning progress. If the AI detects that the student has been studying for an extended period and their performance starts to decline it could suggest taking a break.

Find one set of HCI design guidelines. Similarities and differences between the HCI design guidelines and the Human-AI interaction guidelines.

The human-Computer Interaction (HCI) design guidelines i want to compare with is Nielsen's 10 Usability Heuristics.

Similarities: Both guidelines focus on keeping users informed. Nielsen's "Visibility of system status" heuristic suggests that systems should always keep users updated on what is happening. Similarly, AI Guideline 03 calls for systems to alert users when a timed action, such as a session timeout, is about to occur.

Differences: The AI guideline focuses on the system adapting to user behavior in real-time, like delaying actions if the user seems busy. Nielsen's guidelines, on the other hand, are more about fixed design principles and do not require the system to change based on user actions.

1.5 Journal - everyday engagement, interaction and use

Paper writing: It feels very natural to write with paper. when writing on paper, I only use one hand as opposed to the keyboard, this allows me to feel a little more free. Using pen and paper boosts my creativity in ways that typing on a keyboard doesn't. I also tend to make fewer mistakes when writing by hand compared to typing. However, paper writing can get a bit messy; when I do make an error, I have to cross out the word with my pen, which can make the page look cluttered.

Qwerty keyboard: When using a keyboard, I can type much faster, and unlike handwriting, my hands get less tired. While I do tend to make more typos along the way, correcting them is much quicker, and the autocorrect or spell check features often catch mistakes for me, which is a feature i appreciate.

By voice: Using my voice allows me to be more free and creative. I don't have to split my attention between a screen or paper and the words I'm writing. Instead, my thoughts flow more naturally when I can simply speak them out loud. I can even lie on the bed, stare at the ceiling, and let the ideas pour out effortlessly.

Source:

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issues and sections;CAPTCHAs;Cognitive science;Artificial intelligence;Communications technology;Behavioral sciences;Psychology},