



MINISTRY OF FINANCE
FINLAND

... AND THEN THERE WAS CHATGPT

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COGNITIVE SCIENCE
DIGITAL HUMANITIES



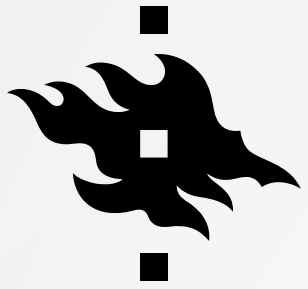
TODAY: WHAT IS SO SPECIAL ABOUT CHATGPT?

1. Some cognitive science

- A rough overview on chatGPT and other LLM-based applications from a cognitive science point of view
- What is so special about them?
- How, or on what grounds to use LLMs for learning and teaching purposes
 - Didactical reason: Do they support learning? If so, in what tasks?
 - Literacy skills: Science (and society) is rapidly algorithmizing
 - It is a necessity to have sufficient literacy skills on these systems

2. Some philosophy

- random thoughts on the educational needs they raise



FROM A COGNITIVE POINT OF VIEW

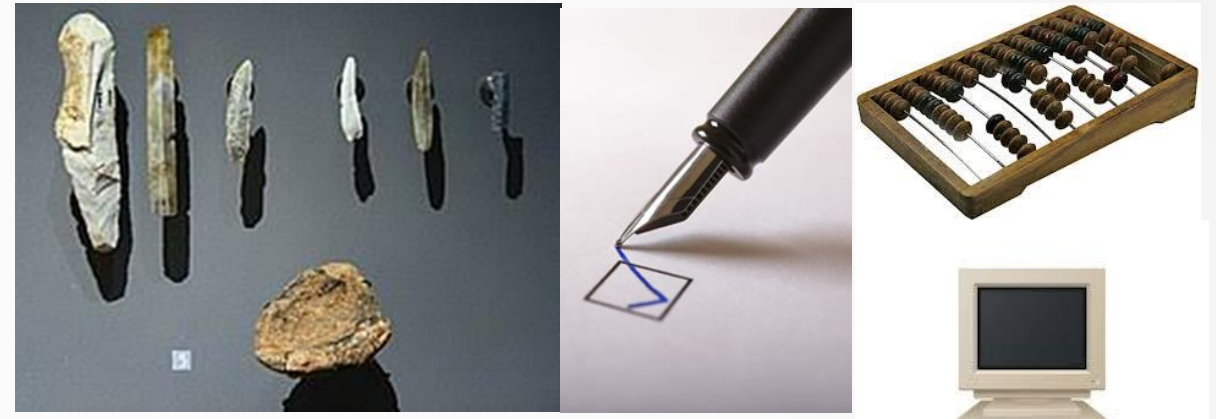
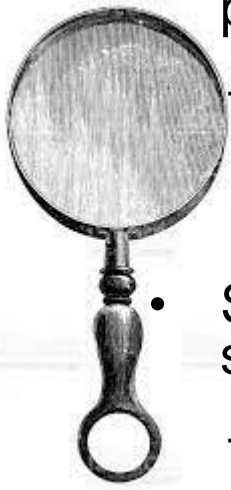
- LLMs continue the development of COGNITIVELY ACTIVE (CA) tools and instruments

- extend the boundaries & supports perceptual and cognitive capabilities

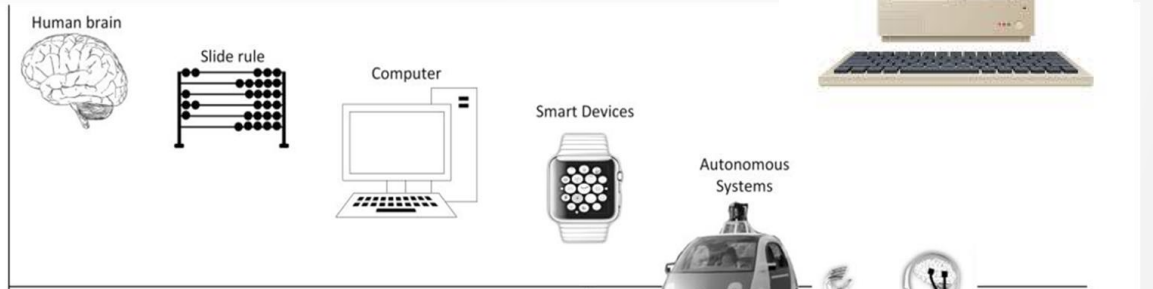
– Memory, sensory systems (VR, AR, measurement systems), categorization and recognition (Image recognition, speech recognition...),...

- Supports complex cognitive control of skilled action:

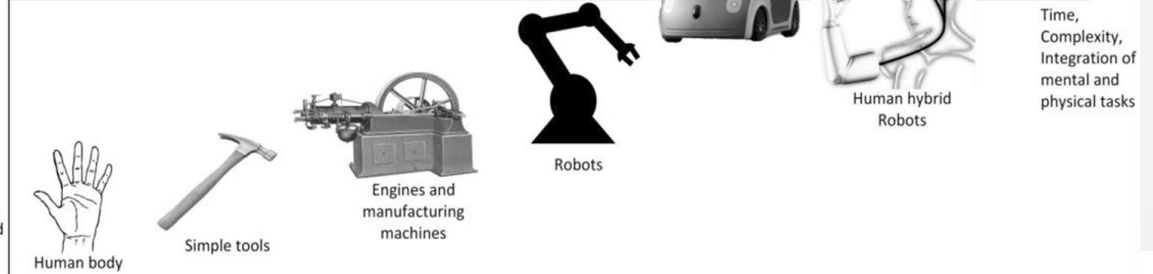
– Writing, text-editing,... (chatGPT)
 – Problem solving, decision making...

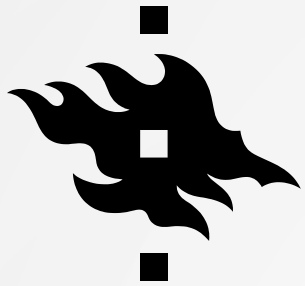


Tools for processing Information, cognitive and mental tasks



Tools supporting physical work and production of physical goods

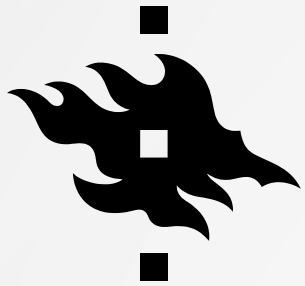




PARROTS OR... MORE?

- LLMs: DNN- based, pre-trained models, which can recognize, summarize, predict and generate... content based on information gained from massive datasets.
 - extremely effective in many tasks, e.g. capturing the structure of text (chatGPT)
- **A common misconception: “Just parrots”**
 - LLMs “parrots” excerpts from the database that was used to train them.
- **In reality: “Sophisticated parrots”**
 - able to generalize and predict from finite set of sentences in a cognitively sophisticated way
 - **Empirical evidence: human brains share some computational principles of processing with them (cf. Goldstein & al, 2022 on GPT-2...)**





SOPHISTICATED PARROTS AS COGNITIVELY ACTIVE TOOLS

- *If* LLMs process texts share some similar comput. principles with human brains, *then*
 - LLMs may fit well with human users in SOME tasks
 - cognitive usability; support for human performance in "parroting" tasks
 - the cognitive fluency/intuitive "familiarity" of use; no disruptions/processing gaps at the level of interface (of human-mach. int. action)
- Differences:
 - Mistakes (e.g. violations of syntactical structures...)
 - Hallucination: the lack of factual knowledge/"functional language skills"/epistemic abilities
 - In human brains, typically based on non-parroting abilities





SO, ARE PARROTS USEFUL...?

- **May provide a set of cognitively "fluent" tools for parroting, useful for many "classroom tasks":**
 - Distilling/editing text (drafting, text production...), sentence formation (language learners),...
- **But for which tasks, and on what grounds?**
 - IMHO: on didactical grounds – do they really, really support learning in THESE tasks?
 - **If so, how?** (We don't know, yet).
 - Raises a question of algorithmic skills

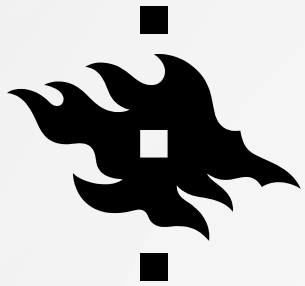




PARROTS AND THE QUESTION OF ALGORITHMIC LITERACY SKILLS

- what do you need to know about these systems so that you 'll be able to use them efficiently, purposefully and safely?
 - Efficiency: sufficient understanding on the processing principles and impact on human learning/other tasks
 - how to use them, and for what?
 - The similarities and differences between diverse cognitive and computational systems
 - Possible technical sensitivities: e.g. bias-, brittleness and black-box issues/ degrees of reliance
 - How much is enough?





**THANK YOU
KIITOS**

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