Artificial Intelligence

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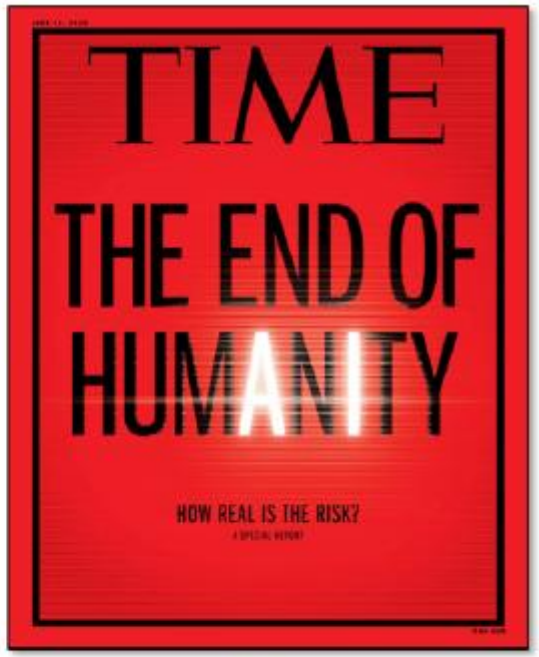
AI boom in 2023

Cosmopolitan
www.cosmopolitan.com



Time
https://time.com

Economist
www.economist.com

Science
www.science.org

What is Artificial Intelligence?

The father of Artificial Intelligence John McCarthy – “The science and engineering of making intelligent machines, especially intelligent computer programs”.

Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think.

AI is accomplished by studying how human brain thinks, and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.

Philosophy of AI

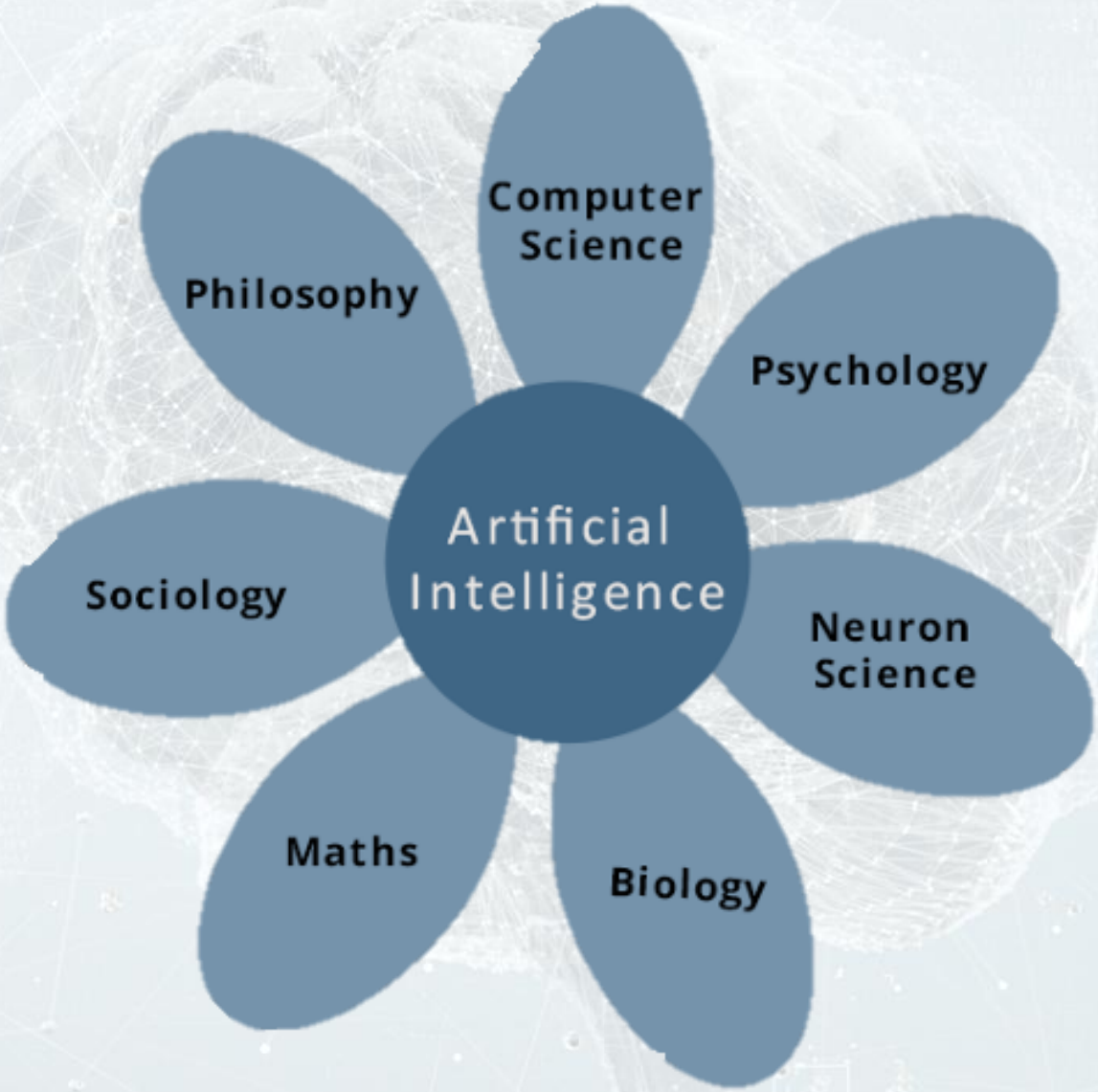
It starts with simple question:

Thus, the development of AI started with the intention of creating similar intelligence in machines that we find and regard high in humans.

Goals of AI

- **To Create Expert Systems:** The systems which exhibit intelligent behavior, learn, demonstrate, explain, and advice its users.
- **To Implement Human Intelligence in Machines:** Creating systems that understand, think, learn, and behave like humans.

What Contributes to AI?



What is AI Technique?

- In the real world, the knowledge has some unwelcomed properties:
  - Its volume is huge, next to unimaginable.
  - It is not well-organized or well-formatted.
  - It keeps changing constantly.
- AI Technique is a manner to organize and use the knowledge efficiently in such a way that:
  - It should be perceivable by the people who provide it.
  - It should be easily modifiable to correct errors.
  - It should be useful in many situations though it is incomplete or inaccurate.

Applications of AI

- **Gaming** – strategic games such as chess, poker…
- **Natural Language Processing** – interact with the computer that understands natural language spoken by humans.
- **Expert Systems** – explanation and advice to the users.
- **Vision Systems** – spying aeroplanes, diagnose the patient, recognize the face of criminal…
- **Speech Recognition**
- **Handwriting Recognition**
- **Intelligent Robots** – robots are able to perform the tasks given by a human.

History of AI

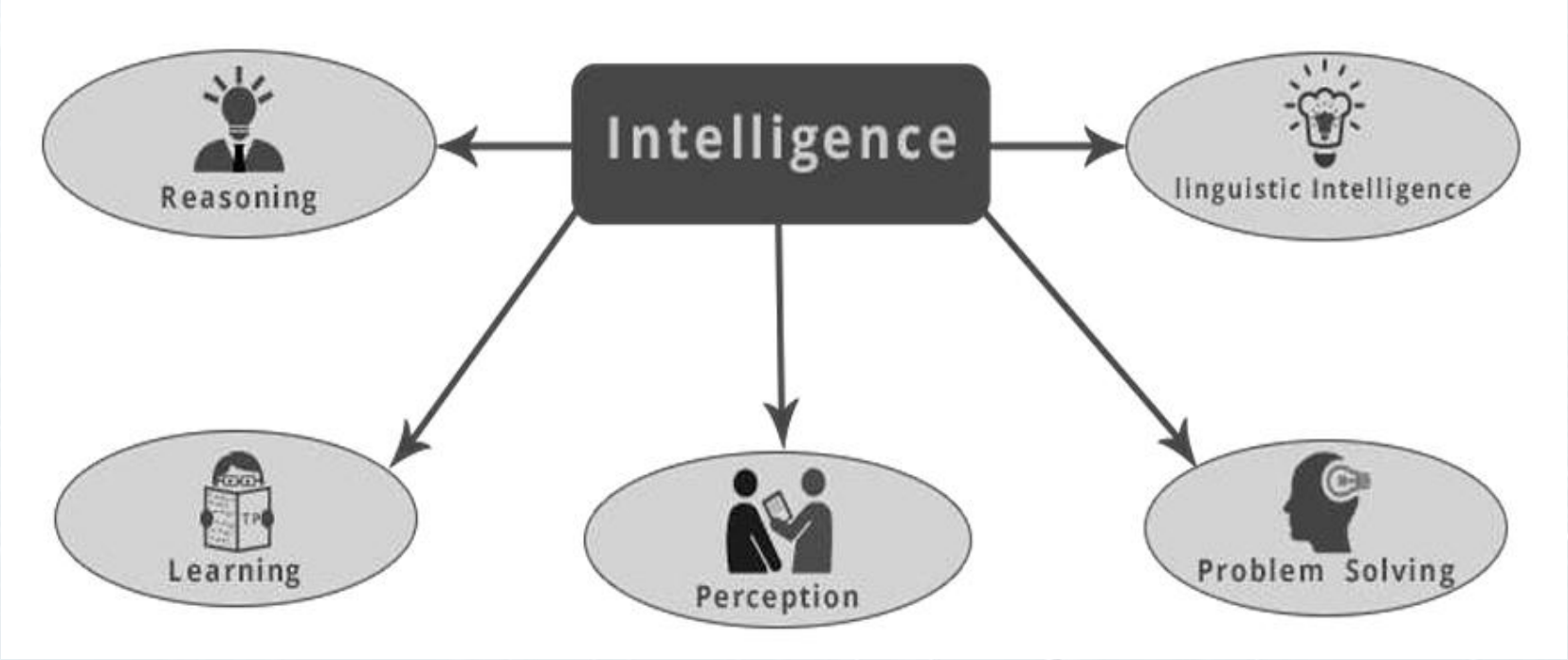
Year	Milestone / Innovation
1923	Karel Čapek's play named "Rossum's Universal Robots" (RUR) opens in London, first use of the word "robot" in English.
1943	Foundations for neural networks laid.
1945	Isaac Asimov, a Columbia University alumni, coined the term *Robotics.*
1950	Alan Turing introduced Turing Test for evaluation of intelligence and published *Computing Machinery and Intelligence.* Claude Shannon published *Detailed Analysis of Chess Playing* as a search.
1956	John McCarthy coined the term *Artificial Intelligence.* Demonstration of the first running AI program at Carnegie Mellon University.
1958	John McCarthy invents LISP programming language for AI.
1964	Danny Bobrow's dissertation at MIT showed that computers can understand natural language well enough to solve algebra word problems correctly.
1965	Joseph Weizenbaum at MIT built *ELIZA*, an interactive problem that carries on a dialogue in English.
1969	Scientists at Stanford Research Institute Developed *Shakey*, a robot, equipped with locomotion, perception, and problem solving.

History of AI

1973	The Assembly Robotics group at Edinburgh University built *Freddy*, the Famous Scottish Robot, capable of using vision to locate and assemble models.
1979	The first computer-controlled autonomous vehicle, Stanford Cart, was built.
1985	Harold Cohen created and demonstrated the drawing program, *Aaron*.
1990	Major advances in all areas of AI: • Significant demonstrations in machine learning • Case-based reasoning • Multi-agent planning • Scheduling • Data mining, Web Crawler • natural language understanding and translation • Vision, Virtual Reality • Games
1997	The Deep Blue Chess Program beats the then world chess champion, Garry Kasparov.
2000	Interactive robot pets become commercially available. MIT displays *Kismet*, a robot with a face that expresses emotions. The robot *Nomad* explores remote regions of Antarctica and locates meteorites.

What is intelligence and what is composed of?

- The ability of a system to calculate, reason, perceive relationships and analogies, learn from experience, store and retrieve information from memory, solve problems, comprehend complex ideas, use natural language fluently, classify, generalize, and adapt new situations.



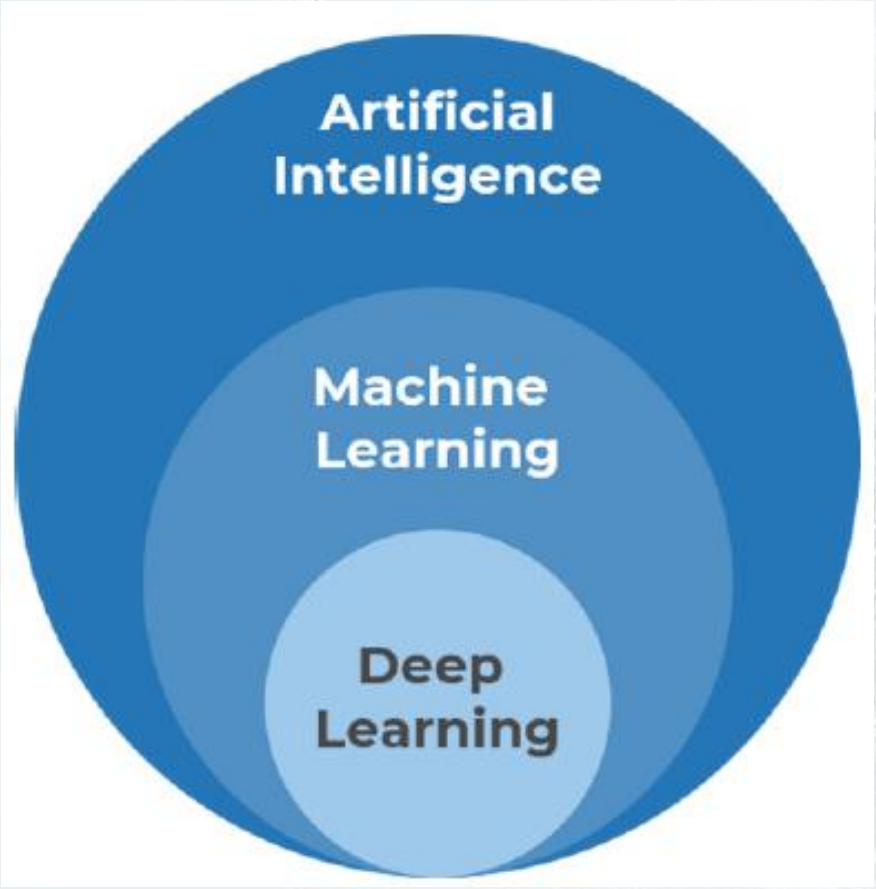
What is intelligence and what is composed of?

- **Reasoning:** It is the set of processes that enables us to provide basis for judgement, making decisions, and prediction.
- **Learning:** It is the activity of gaining knowledge or skill by studying, practicing, being taught, or experiencing something.
- **Problem solving:** It is the process in which one perceives and tries to arrive at a desired solution from a present situation by taking some path, which is blocked by known or unknown hurdles.
- **Perception:** It is the process of acquiring, interpreting, selecting, and organizing sensory information.
- **Linguistic Intelligence:** It is one's ability to use, comprehend, speak, and write the verbal and written language.

Difference between Human and Machine Intelligence

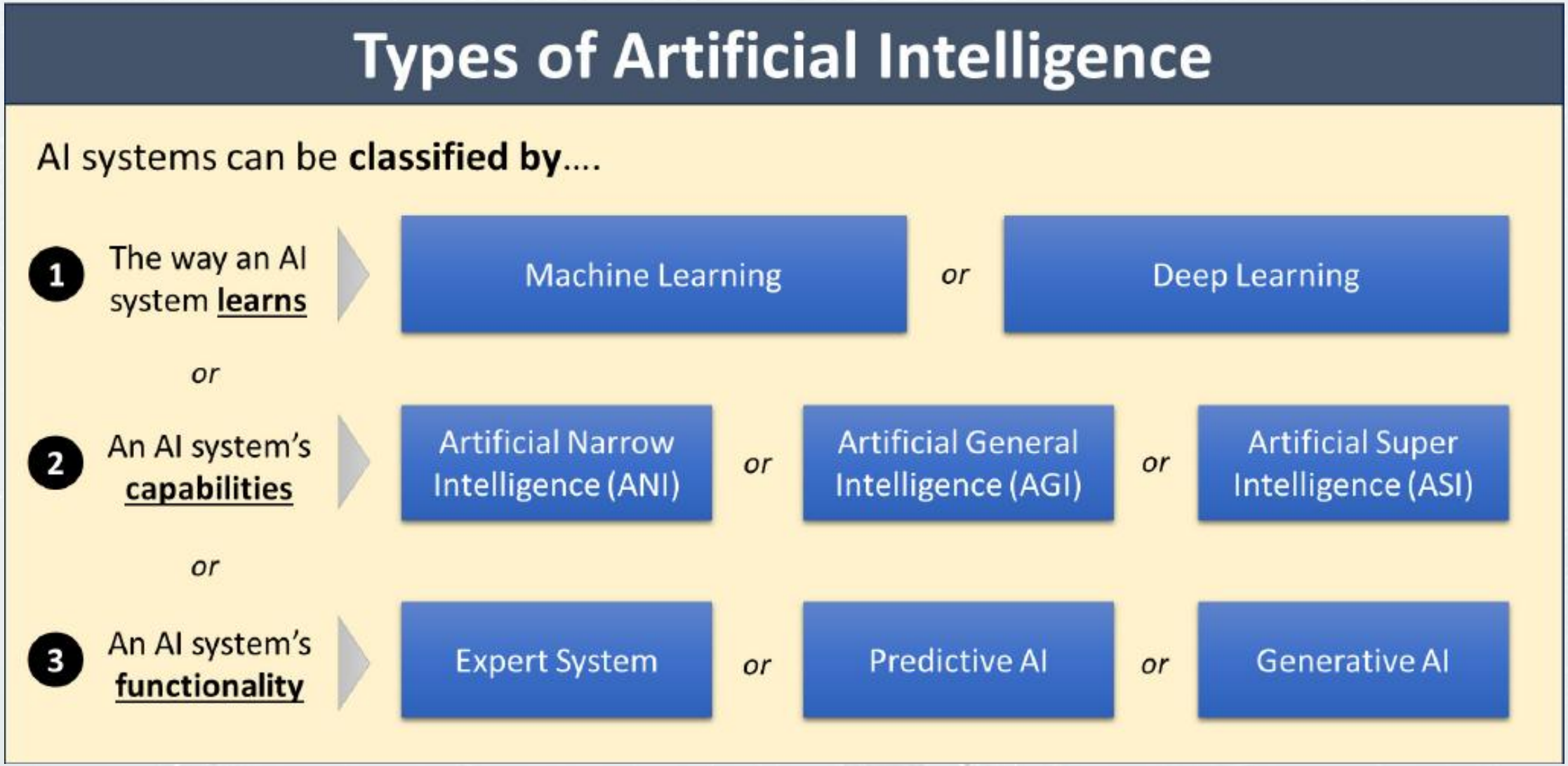
- Humans perceive by patterns whereas the machines perceive by set of rules and data.
- Humans store and recall information by patterns, machines do it by searching algorithms. For example, the number 40404040 is easy to remember, store and recall as its pattern is simple.
- Humans can figure out the complete object even if some part of it is missing or distorted; whereas the machines cannot correctly.

Primary methods for how an AI system ‘learns’ to perform a task



- Machine Learning (ML) – systems can learn from huge amounts of data and continuously improve their performance over time when provided with more and/or better quality training data. With this ‘knowledge’ gained from training data, machine learning powered AI systems can then make predictions (such as for weather forecasting), or recognise patterns in data (such as for image and speech recognition).
- Deep Learning (DL) – more sophisticated subset of Machine Learning and uses complex processes inspired by the human brain called Artificial Neural Networks (ANN).

Types of Artificial Intelligence



AI system based on its capability

Artificial Narrow Intelligence (ANI)

Also called **Narrow AI**, or **Weak AI**. These are AI systems that are designed to perform one specific task (or a narrowly defined set of tasks)

Example ANI systems include a (simple) AI powered email spam filter, or a (complex) self-driving car

ANI systems cannot apply their knowledge to multiple areas (e.g. an AI spam filter cannot also operate a self-driving car)

ANI systems are the most common type of AI in use today

or

Artificial General Intelligence (AGI)

Also called **General AI**, or **Strong AI**. These are AI systems that can perform a range of tasks with human like performance and can also apply their knowledge to several areas (including topics they may not have been specifically trained on)

AGI systems do not yet exist, but are a major goal of AI research and can involve the integration of AI with robotics, so a system can 'think' and perform physical tasks

Several AI and robotics companies have a stated goal to develop AGI solutions

or

Artificial Super Intelligence (ASI)

These are hypothetical AI systems that are more capable and intelligent than humans

They are often associated with a point in time known as the 'Singularity', which is a hypothetical point at which the growth of AI becomes uncontrollable and irreversible.

ASI raises many ethical and philosophical questions for the future of humanity

AI Tools frequently used by students

Tool Name	Purpose
Grammarly	AI-powered grammar and style checking
QuillBot	Paraphrasing and summarizing text
ChatGPT	Writing help, brainstorming, summarizing, Q&A
Notion AI	Note-taking, auto-organizing, summarizing
Scribbr	AI-supported citation generators and plagiarism checking
Elicit	Research assistance using AI to analyze academic papers
Otter.ai	Transcribing lectures and interviews
Perplexity.ai	AI-based research assistant with source linking

AI tools frequently used by teachers / educators

Tool Name	Purpose
ChatGPT / Gemini / Claude	Lesson planning, content generation, quiz creation
Khanmigo (Khan Academy AI)	Tutoring support and teacher assistance
Edpuzzle AI	Create interactive video lessons with automatic suggestions
MagicSchool.ai	Teacher-specific AI assistant for rubric building, feedback, and planning
Curipod	Generates lesson slides and activities aligned with curriculum standards
Gradescope (AI-assisted)	AI-supported grading of scanned exams and assignments
Canva AI	Presentation and graphic design for educational content

AI tools for text generation

Tool Name	Purpose
ChatGPT / GPT-4	Conversational text, academic writing, code, etc.
Jasper.ai	Marketing and long-form content writing
Copy.ai	Advertising copy, emails, product descriptions
Writesonic	Blog posts, ad copy, website content
Sudowrite	Creative writing for fiction and stories
Rytr	Lightweight tool for short-form content generation

AI detection tools (detect if a text was written by AI)

Tool Name	Purpose
Turnitin AI Detection	Built into Turnitin to check for AI-generated text in student work
GPTZero	Designed for teachers to detect ChatGPT-generated content
Originality.ai	Plagiarism and AI-generated content checker (used by publishers)
Crossplag AI Detector	Lightweight tool for academic integrity checks
Sapling AI Detector	Classifies text as human- or AI-written
Winston AI	Advanced AI detection, designed for educators and publishers
Writer.com AI Content Detector	Free tool to evaluate marketing or academic content authenticity

TOP AI ADOPTION STATISTICS

Digital Adoption

of consumers use AI, reflecting their expectation of enterprises offering AI services.

of businesses feel concerned about becoming dependent on AI. (this citation from Authority Hacker AI Survey 2023 appears throughout.)

of marketers currently use AI tools for work

of marketers today frequently use AI tools

of marketers use AI daily

The environmental costs of AI

- High energy consumption during AI model training and inference
- Data centers contribute to carbon footprint
- E-waste generation and natural resource depletion
- Indirect consequences from mining and transportation

Mitigate the environmental impact with AI

- Develop energy-efficient AI models
- Adopt green computing practices in facilities and data centers
- Conduct lifecycle assessments for eco-design management

Beyond sustainability with AI

- Optimize workflows reduce energy consumption and resource waste
- Decision support systems save resources
- New clean power offers sustainable low-carbon energy
- Autonomous AI could reduce healthcare greenhouse gas emissions

Who owns AI-generated content?

- Texts (e.g., essays, articles, code) – when an AI generates a piece of text, it does not have authorship. The user who prompts the AI is usually considered the “creator,” but:
  - In academia or publishing, disclosure is often required.
  - AI cannot hold copyrights under current law in most countries.
  - In collaborative contexts, the work may not be eligible for legal protection.

Who owns AI-generated content?

- Images (e.g., generated by DALL·E, MidJourney, etc.)
  - AI-generated images may be free to use depending on the platform's terms.
  - According to current U.S. Copyright Office guidance, AI-generated art is not protected by copyright unless there's significant human input.
  - The creator is the person who guided the process (through prompts or editing), not the AI itself.

Global Guidelines and Frameworks

- OECD Principles on AI
- EU AI Act – A legal framework regulating AI use within the European Union.
- UNESCO Recommendations on the Ethics of AI
- IEEE Ethically Aligned Design
- AI Ethics Guidelines by tech companies (e.g., Google, Microsoft)

Ethical Dilemmas and Open Questions

- Should AI be used in lethal autonomous weapons?
- Can AI replace human decision-making in courts?
- Who is responsible if an AI harms someone?
- Should students be allowed to use AI tools in education?
- Can AI create art or music that's emotionally meaningful?

Thank you for your attention!