

# Should We Be Worried About Artificial Intelligence?

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# Introduction

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- Artificial Intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. Apparently, common sense is not required yet for AI.
- Such systems would be endowed with the ability to reason, discover meaning, generalize, or learn from past experience.
- Human intelligence is characterized by the combination of five components: learning, reasoning, problem solving, perception, and using language.
- Expert Systems operate in narrow fields such as chemical analysis or credit authorization, and can often outperform any single human expert.
- Alan Turing: Intelligence is simply our name for any problem-solving process we do not yet understand.

# Recent Excitement Over AI

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- Open AI allowed public access to their LLM ChatGPT in November 2022
- Large Language Models, LLMs, have extremely-large databases of knowledge (nothing newer than 2021 in this case for Chat GPT)
- The number of ChatGPT users is already in the hundreds of millions, a record
- Proponents see potential for solving big problems such as climate change, but critics worry that the AI's capabilities already exceed the creators' understanding of its behavior
- Remember the science-fiction stories where the machine outwits the inventor, usually with fatal consequences?

# Comparison of Chat GPT with Earlier AI Efforts

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- Early AI systems in 2012 used carefully-labelled training data, and were able to accurately recognize human speech and many types of images.
- Today, ChatGPT is trained on such large databases that they cannot be pre-labelled by the administrators.
- Widely-used Google and Bing search tools are already enhanced with some ChatGPT capabilities so there are lots of random prompts testing it.
- Already, many ChatGPT users have discovered serious errors in the responses from it, such as attributing a crime to the wrong person, or making obvious factual errors.

# Experts and Public Are Anxious About LLM Safety

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- “Pause for 6 Months” says a letter from Future of Life Institute, signed by tech luminaries including Elon Musk (unlikely and unenforcible)
- Public is worried the a “tsunami of misinformation” could upset the upcoming election in 2024 by creating an atmosphere of total distrust
- AI experts Gary Marcus (Emeritus Professor at NYU) and Anka Reuel (PhD Student in Computer Science at Stanford) think the world needs an international agency for artificial intelligence
- They call for the development of a global, neutral, non-profit, International Agency for AI, (IAAI)
- International precedents already exist for Civil Aviation and Atomic Energy

# Who Should Regulate AI?

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- The Federal Trade Commission is already dabbling in the regulation of AI by investigating the policies of OpenAI regarding sales to businesses for access to ChatGPT. The Biden administration wants to strike a balance between fostering competition and preventing harm
- Labor unions are worried that AI will eliminate jobs when businesses adopt AI
- Privacy advocates worry that AI will enable bad actors to defraud and manipulate the public if personal/private data is exposed
- Some tech companies want the U.S. Government to establish a new federal agency to license AI systems, while other tech companies prefer a central agency plus subordinate sectoral agencies for the various industries

# Issues Needing Regulation

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- Intellectual property Rights
- Strict testing and Pre-approval before release to the public
- Privacy
- Dedicated International Regulator
- Automated tools to monitor/detect misinformation and viruses

# Computer Hardware Involved in AI

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- Computers used for AI are starting to use stacks of chips, called chiplets, to assemble powerful functions, LEGO-style, without designing a massive chip from scratch
- The Apple Mac Studio computer is an early example of chiplet technology
- Seven companies (AMD, Intel, Microsoft, Nvidia, Samsung & TSMC) formed a coalition to create standards for designing chiplets
- TSMC, Taiwan Semiconductor Manufacturing Company, the largest contract maker of chips, whose clients include Apple, is doubling the manufacturing space for chipset-based products by next year



# Competition for the AI Chip Market

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- Nvidia is the leading supplier of AI chips, furnishing 80% of the chips sold
- They had long been the main source of chips for video games and BitCoin Mining computers, so that heritage quickly evolved into AI chips
- Nvidia stock price doubled in the past year, and the market valuation now exceeds \$1 trillion. Forbes estimates Nvidia will surpass Apple in 5 years!
- Competitors AMD and Intel are chasing the AI market, with comparable benchmark performance and not limited to the proprietary software of Nvidia
- Surprisingly, Google and Amazon's cloud-computing division are designing AI computing chips for their data centers and for sale. The usual factories, like TSMC produce the chips. AI chips are 6% of TSMC's output; smartphone chips are 33% of output