

# AI and Technology Trends

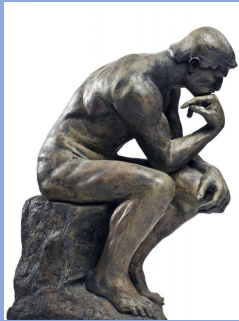
*Introduction and workforce implications*



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*June 12, 2023*

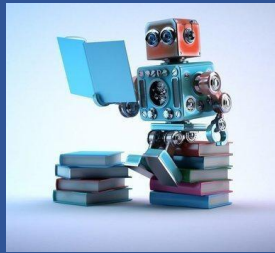
# ARTIFICIAL INTELLIGENCE

Algorithms that can sense, reason, act and adapt with human-like intelligence



# MACHINE LEARNING

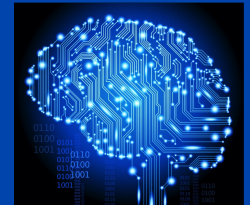
Algorithms where machines learn from vast amounts of data



# DEEP LEARNING

Algorithms that mimic multilayered neural networks in our brain

Vision  
Recommenders  
Languages  
Generative AI



AGI?

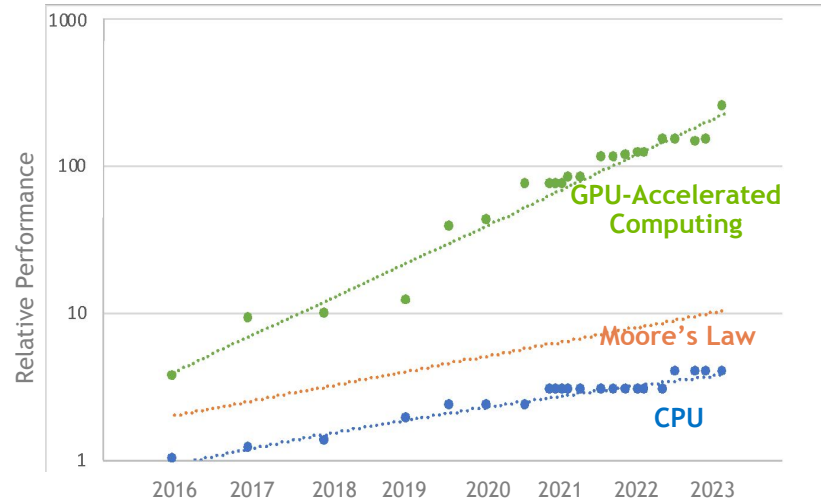
1950 1960 1970 1980 1990 2000 2010 2020 2030 2040

# The rise of Accelerated Computing

## Huang's Law

“...SILICON CHIPS THAT POWER ARTIFICIAL INTELLIGENCE WILL **MORE THAN DOUBLE** IN PERFORMANCE EVERY TWO YEARS... ATTRIBUTED TO BOTH **HARDWARE AND SOFTWARE.**”

## Beyond Moore's Law



Measured performance of Amber, CHROMA, GTC, LAMMPS, MILC, NAMD, Quantum Espresso, SPECfem3D



# AI is everywhere

Agriculture, Farming	Art (Music, Paintings)	Climate change
Cybersecurity	Defense	Delivery robots
Education	Energy	Finance
Healthcare	Infrastructure	Languages
Manufacturing	Public services	Technology
Transportation	Vision	Voice assistants



# Challenges

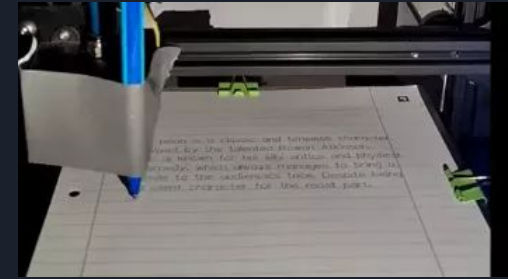
Data integrity, availability, privacy, and security

Bias and ethics

Talent pipeline

Trust and safety, accountability

# Skills gap - where to invest



## Training and Education emphasis:

- Data: literacy, mining, privacy, sourcing, visualization and analysis
- Ongoing, cross-disciplinary curriculum development at K-12, public colleges and universities
- Hands-on projects to train, fine-tune, and deploy neural networks
- Development of tools and algorithms to detect bias and misuse
- Human skills: collaboration, communication, empathy, self-critique, critical thinking
- Upskilling programs
- Enable lifelong learning



# Opportunities

- Quantify and bridge the Digital divide
- Improve outreach and awareness among priority populations
- Increase access to technology programs. Understand and remove barriers.
- Explore industry partnerships
- Establish desired outcomes and how to measure success
  - Define metrics to track, evaluate, and adjust programs to achieve



# Backup



# Video

