

**Feasibility And Ethical
Considerations of
Human-Like Artificial
Intelligence**

Outline

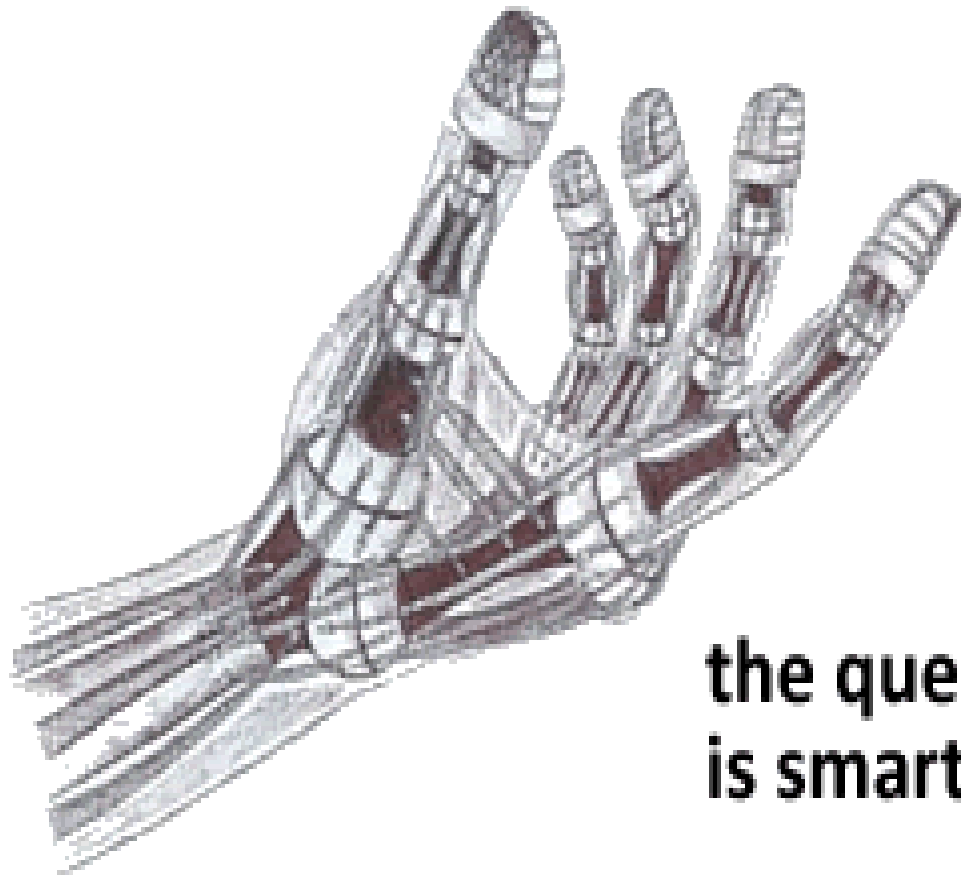


- What is AI?
- Examples of Advanced AI
- Natural vs. Artificial Intelligence
- Consciousness
- Ethical Considerations
- Ethical Analysis
- Summary

Artificial Intelligence

- What is AI
 - ▣ The science of intelligent machines and software
 - ▣ Intelligence is the computational part of achieving goals
 - ▣ At the fundamental level: creating a program that can think, decide and pass judgment
- Weak vs. Strong
 - ▣ Weak $<$ than human intelligence. Relatively simple problems
 - ▣ Strong \geq human intelligence. Hard problems – NP Complete

Where we compete with artificial intelligence,



the question then becomes: Who is smarter, man or machine?

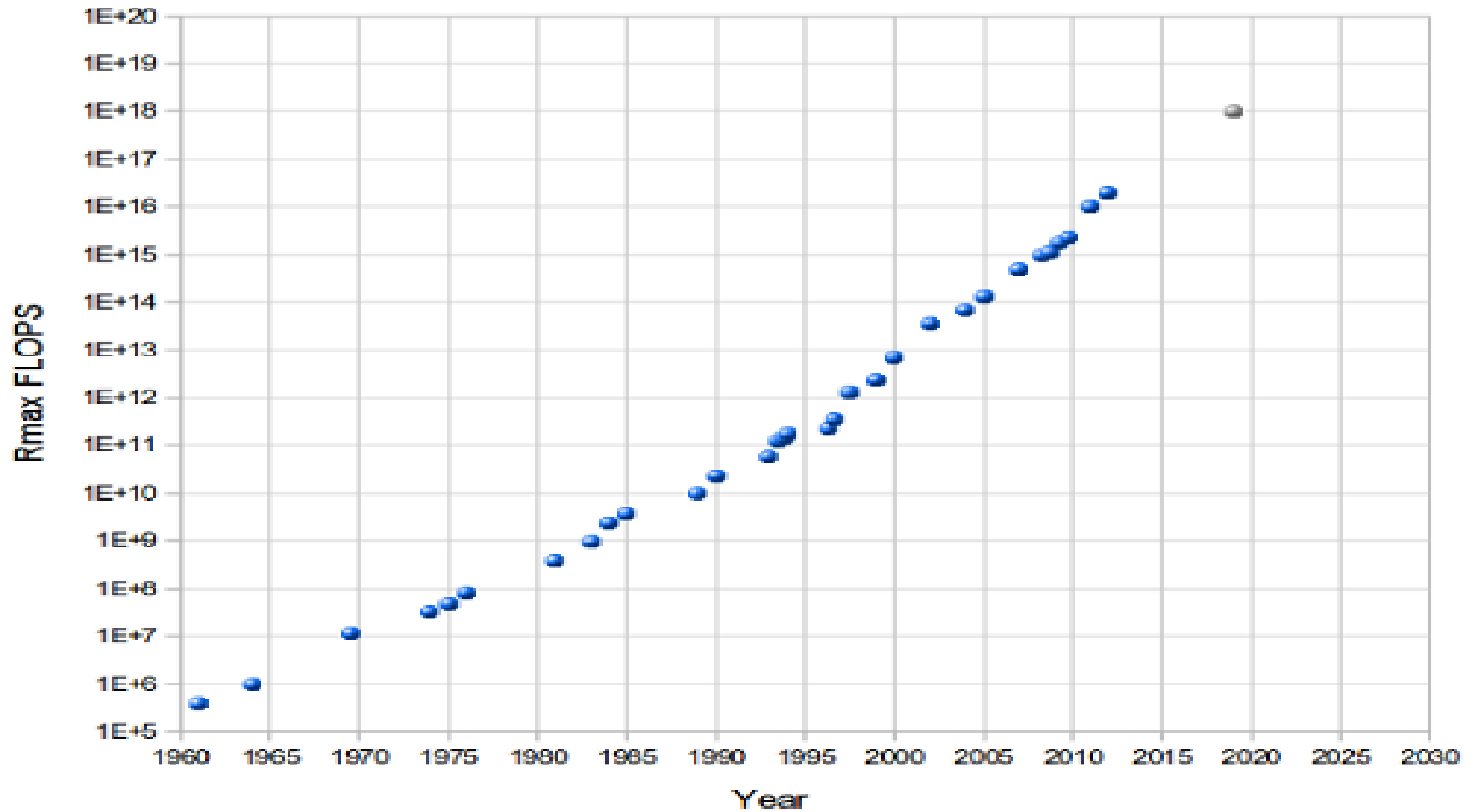
Examples Of Advanced AI

- Deep Blue, Deep Fritz
 - ▣ Beat Grand Masters in chess in 1997, 2006
- Stock Exchanges
 - ▣ Algorithms handle over 1/3 of all transactions
- DARPA and Google Automated Cars
 - ▣ Self-driving autonomous vehicles
 - ▣ Grand Challenge
- Video Games
 - ▣ F.E.A.R
 - ▣ Halo Reach
- Watson
 - ▣ Competed in Jeopardy
 - ▣ Defeated past Champions to win title in 2 game series

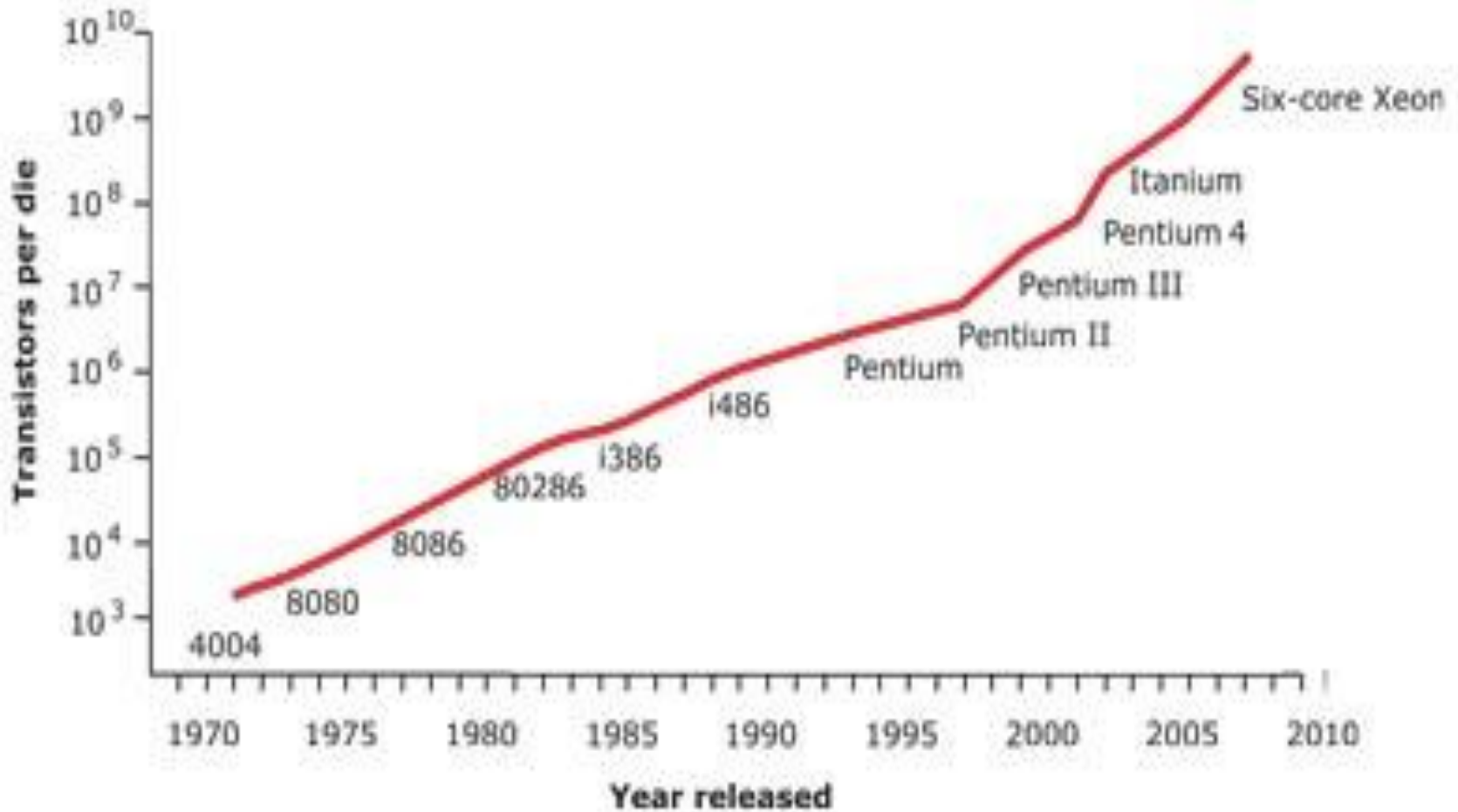
Natural vs. Artificial Intelligence

- Human brain is very complex
 - 10^{11} neurons
 - 10^{16} synaptic transactions per second
 - 10 TB memory space
- Computers are catching up
 - 10^{19} calculations per second to simulate brain
 - Worlds fastest – 2.57×10^{15} cps
 - Moore's Law
 - Faster switching time
 - Nanoseconds vs. milliseconds
 - Carbon nanotube technology
 - “The computing power needed to run a brain simulation will be commonplace by the year 2025”

Computing Power



Computing Power cont.



Mind Over Matter

- Is the mind a direct result of the brain or does it emerge as a meta phenomenon?
- Reductionism
 - ▣ Human intelligence is the sum of the activity of the brain
 - ▣ A full model of the brain would then spawn the mind
- Reductionist has debatable points
 - ▣ “If objects are described by normal science, why is that science not rich enough to describe the body associated with the experiencing subject?”

Consciousness

- State of self-awareness
 - ▣ Able to determine ones' self from another
- Cartesian Duality
 - ▣ Consciousness and the mind are non-physical
 - ▣ They cannot be represented by science
- Materialism
 - ▣ Consciousness and intelligence are emergent
 - ▣ Come from interconnections of neurons
 - ▣ Can be seen in nature – birds, fish

Ethical Considerations

- If AI becomes sentient, is it alive?
 - ▣ Can computers be considered the same as humans?
- What qualifies as alive?
 - ▣ Breathe oxygen and drink water? – Not strong enough
 - ▣ Carbon based? – Also not strong enough
 - Astrophysicists believe silicon would be close replacement for carbon due to a similar molecular structure
 - ▣ Metabolic processes?
 - Computers consume energy and produce heat – same as humans

Ethical Considerations cont.

- If AI could be considered alive, is it human?
 - ▣ Can look like a human
 - ▣ Replicate the human brain, so think and act like human
 - ▣ Could even be built to consume matter and produce energy

- Would it be considered a separate species?
 - ▣ Or a subspecies of hominid?

Ethical Considerations cont.

- Religious aspect
 - ▣ Playing God?
- Slavery
 - ▣ Buying/Selling of robots
 - ▣ Use them against their will
- Murder
 - ▣ Can we destroy what we create?
- Citizenship?
 - ▣ Would they be considered equals to humans?

Ethical Analysis

□ Kantian

▣ Second Categorical Imperative:

- Don't treat others as means to an end
- Robots would be used as workers or slaves
- Would be using them to perform labor (a means to an end)
- Problem – do we consider them others or devices?
- Let us assume we consider them as beings

□ Analysis: Not ethical

Ethical Analysis cont.

- Act Utilitarian
 - Great cost in research, time and materials
 - Inevitable law-suits, patent suits, etc.
 - Would prove invaluable as labor
 - Could work in dangerous locations
 - Could perform menial labor
 - Could have great strength and stamina
 - Allows humans to perform intellectual work
 - May become soldiers
- Analysis: The good outweighs the bad

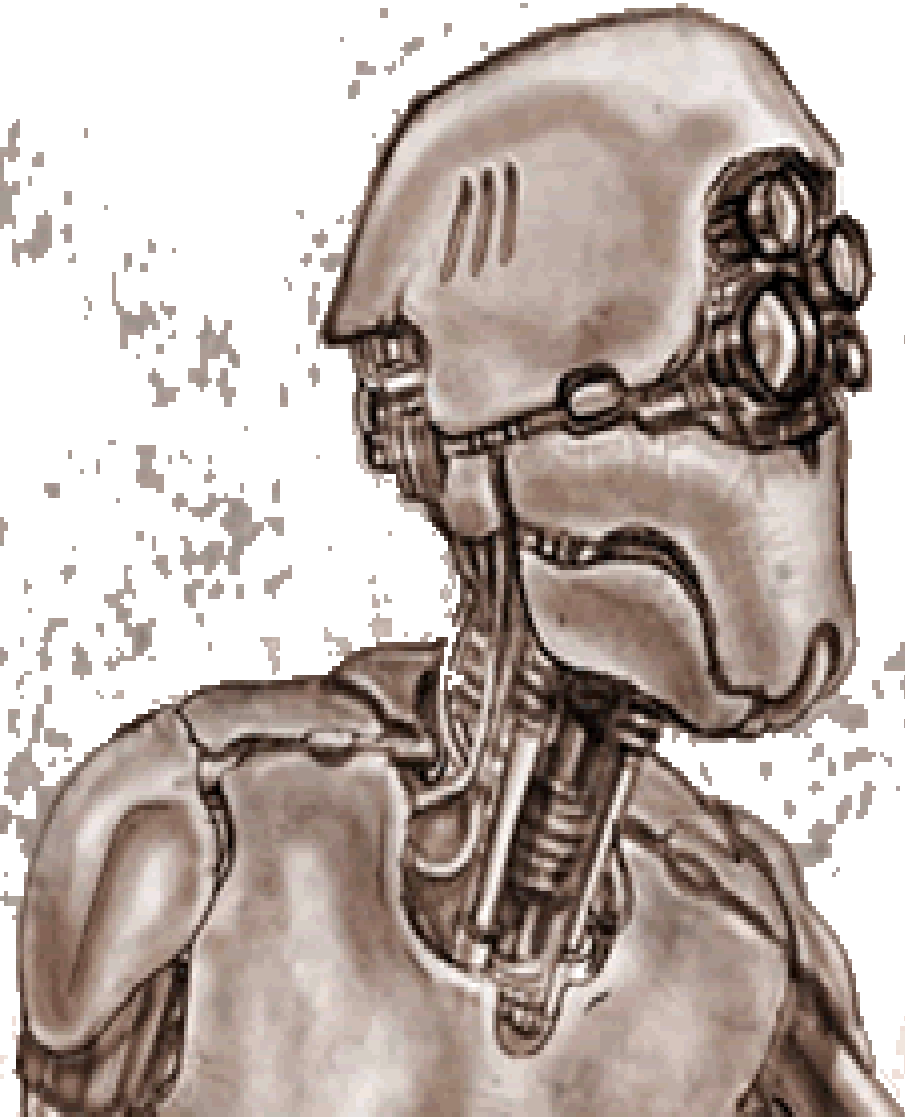
Ethical Analysis cont.

- Social Contract Theory
 - ▣ Societies would need to form rules about treatment
 - ▣ In today's interconnected world, this would prove difficult
 - ▣ Societies would tend towards rules that would benefit the rich end of society that could afford the machines
 - Similar to slavery in the U.S.
 - ▣ Until the machines can stand up for their rights, they would be repressed by society
- Analysis: Not ethical

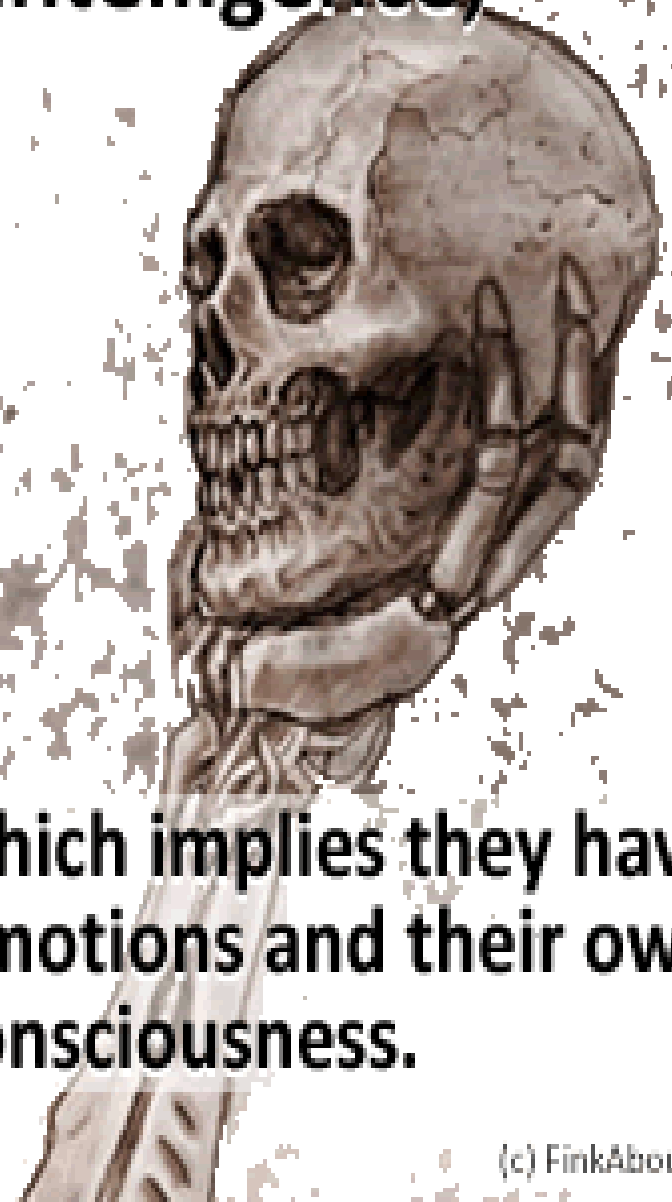
Summary

- Advanced human-like AI is possible
 - ▣ Technology will be available within the next few decades
 - ▣ Man-made brain may outperform natural brain
 - ▣ Will the machine be simply the brain? Or will a mind emerge?
 - ▣ Would they become conscious?
- Once they arrive, how should they be treated?
 - ▣ As equals? Or as servants?
 - ▣ Most ethical analysis says they would be treated poorly and thus unethically.

Machines conquering the world would have to have a strong artificial intelligence,



which implies they have emotions and their own consciousness.



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