



Artificial Intelligence...

... what's so “artificial” and
“intelligent” about it?



What is AI?

- Mimic humans: thinking & self-correcting computers
- What's **intelligence**?
 - *Agency*: autonomous, reactive, proactive, social
 - Ability to solve problems
 - Knowing all facts, rules, detailed information
 - Ability to look beyond simple facts, *derive* and *infer* connections and dependencies
 - *Abstract* from details and *generalize* solutions



Creating Intelligence

- How is knowledge encoded and acquired?
- How are abstract ideas (mood, feelings, intuitions) represented?
- How is experience gained?
- What are the motivations for acting intelligently?
- Are all humans intelligent?



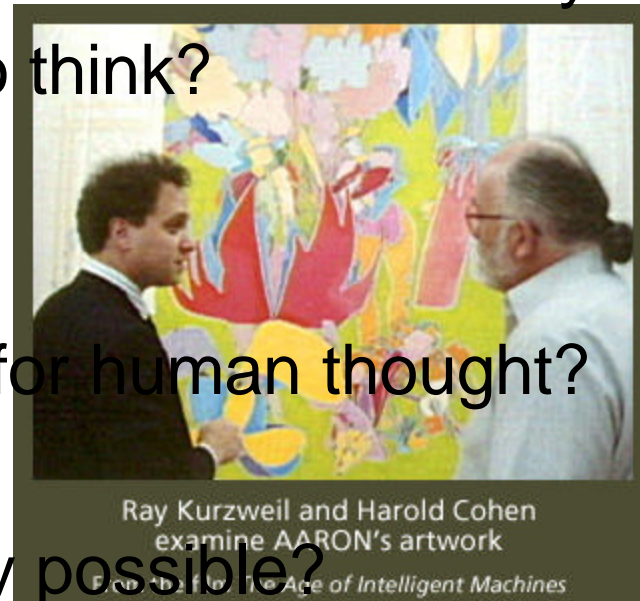
Strong AI vs Weak AI

- Roger Penrose:
 - *Consciousness* is required in order to be intelligent
 - Hence, intelligence can never be produced by any algorithm executed on a computer
- Joseph Weizenbaum:
 - The *unconscious* – cannot be explained by the information processing primitives which we associate with formal thinking, calculation, and systematic rationality
- Douglas Hofstadter:
 - Mental function that becomes *automatic* isn't real thinking
 - AI's whatever hasn't been done yet

Philosophical Debates

- Can computers have free will?
- Can computers have emotions?
- Do humans, unlike computers, have intrinsic intentionality?
- Do computers have to be conscious to think?
- Is the brain a computer?
- Can computers be creative?
- Can symbolic representation account for human thought?
- Can computers be persons?
- Are thinking computers mathematically possible?
- Does God prohibit computers from thinking?

See [hi_interview](#) !



Ray Kurzweil and Harold Cohen
examine AARON's artwork

From the film *The Age of Intelligent Machines*



Thinking's Not Enough

Systems that think like humans	Systems that think rationally
Systems that act like humans	Systems that act rationally

- Modern AI teases “thinking” apart from “decision making”



AI in Action

- Machine translation (babelfish)
- Game playing (tic-tac-toe, chess)
- Medical diagnosis (expert systems)
- Economic projections (stocks)
- Computer vision (colour recognition)
- Speech processing (Bell)
- Language understanding (eliza)
- Creating original thoughts/art (poetry)
- Software Agents (paperclip, google)
- Robots (mining)
- Machine learning (patterns, parameters)



How good can it get?

- Depends on what humanity wants to do
- John McCarthy's forecast:
 - People will want to live longer and better
 - Computer controlled cars
 - Personal flying machines
 - Automatic home deliveries
 - Remote service
 - Household robot servants
 - Expansion into space
 - Supplement human intelligence
 - Demand for new forms of entertainment



Social Implications

- Public safety
 - Control industrial processes (chemical plants, electricity generators)
 - Used in air traffic control systems
- Quality of life
 - Equitable information accessibility
 - Occupational health and safety
 - Predators over the net
 - Censored material readily accessible
- Freedoms
 - Thought and conscience; access to information; opinion and expression
 - Privacy



Netiquette

- Accidental dysfunctionality
 - Information overload; rumour and accidental misinformation; negligent defamation; persistence; minor plagiarism; inadequate care with data; trawling/spidering;
- Socially aggressive dysfunctionality
 - Intentional misinformation; flaming; intentional defamation; harassment; mail-bombing; obscenity; incitement; impersonation; surveillance;
- Economically aggressive dysfunctionality
 - Spamming; advertizing, promotion, soliciting; secondary use of data; serious plagiarism; abuse of IP rights; hacking; viruses and worms; security breach;
- Avoidance dysfunctionality
 - Circumvention; anonymization; obscuration