

Artificial Intelligence

CS 372

BMC

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Forms of AI

- Systems that think like humans
 - Use AI to better understand human thought
 - e.g., Neural Network models of the brain
- Systems that act like humans
 - Use AI to build things like humans
 - Turing Test, Anthropomorphic Robots
- Systems that think rationally
 - Deductive problem solvers – Sherlock Holmes
- Systems that act rationally
 - “Bounded Rationality” etc

AI – my take

- Definition: The study of forming approximate solutions to hard problems
- Studying how people think is great as it can suggest solutions that might otherwise be missed
- Replicating how humans think is a waste of effort
 - Winning the Turing test (look up list of who won recently).

AI – influences

- Math / Physics
 - Simulated annealing, ..
- Economics
 - Bounded rationality, voting theory, ...
- Neuroscience (wet biology)
 - Hebb, Rummelhart & McClelland, ...
- Psychology
 - Analogies, etc

Human Intelligence

- By one theory there are 6 modes of human intelligence
 - Rule Learning
 - Deduction
 - Examples
 - Connectionist
 - Scripts
 - Visual

Ups and Downs of AI

- 1960 -- “5 years to Machine Translation”
- “Expert Systems ...”
- Deep Blue
- Background knowledge
- 5th Generation
- DARPA Mojave drive
- 46 years later...
- Experts are tricky
- Is it AI?
- Cyc failed
- Huh?
- Self driving cars? AI?

Science & AI

- Until mid 80's AI characterized by “I applied this program to this problem and it worked”
 - Little or no analysis of why, the program was the sole focus. Not “science” in any meaningful sense
- Since then
 - Rigorous statistical analysis
 - cross validation, t-tests, f-tests,
 - Standard Data Sets
 - A large number of them are available on the Internet
 - http://cs.nju.edu.cn/zhouzh/zhouzh.files/ai_resource/dataset.htm
 - Analysis is at least as important as program

AI & Philosophy

- Weak AI
 - Machines will be able to act intelligently
- Strong AI
 - Machines will be able to think.
 -
- What is the difference?
- Where does the “Turing test” fit?
- Searle's Chinese Room

Weak AI

- Some negative statements
 - “machines can never do X”
 - The “Star Trek” rebuttal
 - Paper grading on SATs
 - The “incompleteness theorem objections”
 - By the incompleteness theorem computers can't be perfectly logically consistent
 - “Human behavior is too complex”
 - Dreyfus & Dreyfus
 - Uncertainty, no teacher, computers need the “right” data (scientific discovery).

Strong AI

- Passing the Turing test is insufficient (this is the point of the Chinese Room argument)
 - Intent is key
- Consciousness
 - Ironically, Strong AI has pointed to our inadequate understanding
- Self Awareness
 - B.F. Skinner's pigeon experiments
- Turing rejected Strong AI as irrelevant, hence the “Turing test”.