CS404
Artificial Intelligence & Natural Language Processing

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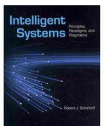
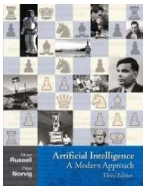
Classes

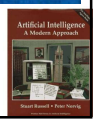
- CSSE4 (SE400)
- SCI 4 - SH (CSS400)
- SCI 4 - DH (CSD400)
- BSC MMWD 4 (MM400W)
- SCIA (CSA400)
- HDipCS (CSF500)
- MSC APPLIED CS (CSAF6)
  - Make sure you are registered on Moodle

Course Information



- Book:
  - *Intelligent Systems" by Schalkoff*
  - ***"Artificial Intelligence"*, Russell & Norvig**
  - *"Artificial Intelligence"*, Luger & Stubblefield
- Final exam is 100%
  - No marked practicals
- Lectures: (see University timetable)
  - Monday 5-6, CB4
  - Wednesday 1-2, CB4





AI Goals

- AI began in Dartmouth summer school
  - 1957 by John McCarthy and others
- Get computers to solve more difficult problems,
  - using Human intelligence as inspiration
- Make computers more useful
- Model various aspects of Human Intelligence
  - See "multiple intelligences" H. Gardner

Other Subdivisions of AI

- Strong vs Weak
  - Strong says AI computer IS actually intelligent. Weak say its only an emulator.
- Hard vs Soft
  - Hard advocates mathematical provability. Soft only care about results.
- Symbolists vs neural networks (sub-symboli)
  - Symbolists can identify unique items of representation. In NN "meaning" only ever arises across multiple distributed units (neurons) (akin to mind vs brain)

CS404 – AI & NLP Topics

- **Artificial Intelligence (AI)**
  - Heuristic Searching
    - Game Playing (α-β search)
  - Genetic Algorithms
    - Cellular Automata
- **Natural Language Processing (NLP)**
  - Document Ranking & Google's PageRank
    - Parsing & Statistical Parsing
  - Processing Analogies & Conceptual Blends

Philisophical Foundations of AI

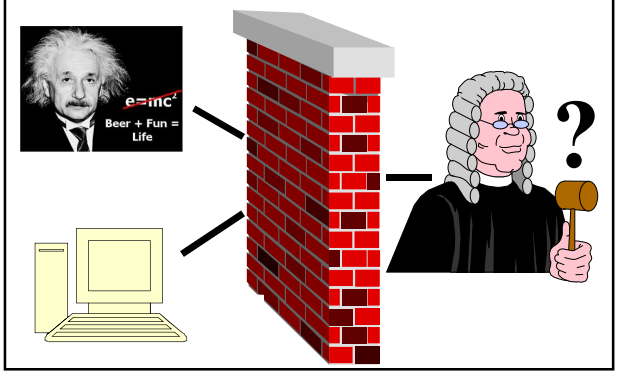
- What what really ***is*** AI?
- What are we trying to achieve? Whats the goal?
- What unites the different sub-topics?
  - of vision, language, learning etc.

Multiple IntelligenceS

- Howard Gander (1983) identified 7/8 distinct ***human intelligences***.
  - *"...the ability to solve problems, or to create products, that are valued within cultural settings"*

1. Spatial,
2. logical-mathematical,
3. body-kinestethetic,
4. linguistic,
5. musical,
6. intra-personal,
7. inter-personal
8. naturalistic.

Turing Test

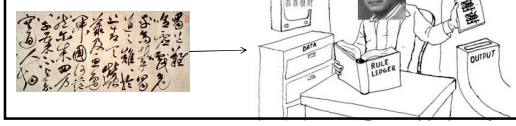


Turing Test

- The "*Imitation Game*".
- A human "judge" can interrogate two intelligent agents, one of which is human the other artificial
- If he is unable to identify the computer then Artificial Intelligence has been achieved
- How realistic a test for intelligence is this ?

Chinese Room by John Searle

- Consider an Englishman who understands only English and is trapped in a room, being passed Chinese messages representing questions. He has rule a simple rule-book to create symbols which represent answers to questions, and passes them out again
- Does (that) man really **Understand** what he is doing ?



Chinese Room Counter-argument

- The whole **System** has intelligence, not individual parts
- CPU isn't intelligent, but whole solution is

Chess

- Operates differently to human chess players
- Compute Next board positions from current board
- Compute a numeric "score" for each board state
- Look ahead several moves, to choose a course of action that is (almost) unbeatable
- Computational horse-Power "fakes" Intelligence

The End.