Comprehension in a digital world II

Chapman University. PHIL398. Lecture 18. 4/8/2021.
Kelvin J. McQueen

Reading schedule and 2nd assignment

- Schedule:
  - This week (week 9): excursion into comprehension:
    Can there be *comprehension* in a digital world?
  - Next week (week 10): excursion into free will and ch16.
    Can there be *free will* in a digital world?
    Does augmented reality extend the mind?
  - Week 11: Value in a digital world.

- 2nd short paper:
  - Due: Friday 11.59pm April 23.
  - Worth 15%.
  - Write a philosophical paper on a topic covered so far (distinct from 1st short paper). A bibliography is necessary and must include at least one reference (other than the Chalmers book). 600-800 words.

Discussion board (w9) posts due 4/10

- **Post 1**: What is the strongest reply to the Chinese room argument? Does the reply work? Explain your answer. 200-300 words.
- **Post 2**: Provide constructive feedback to a post on another student's thread. 150-250 words.

Assignment Rubric Details

Discussion Board Posts

Criteria	Ratings			Pts
Post 1 Response to prompt	**5.0 pts** **Excellent** The post clearly answers the prompt, demonstrates understanding of the reading, and illustrates independent thinking.	**3.0 pts** **Adequate** The post attempts to answer the prompt, demonstrates partial understanding of the reading, but lacks independent thinking.	**1.0 pts** **Inadequate** Does not provide clear answer to the prompt and does not demonstrate understanding of the reading.	5.0 pts
Post 2 Constructive feedback	**5.0 pts** **Excellent** The post responds clearly to another student's post, offers constructive ideas, and is respectful.	**3.0 pts** **Adequate** The post attempts to respond to another student's post, but lacks either constructive ideas or respectful language.	**1.0 pts** **Inadequate** Does not respond to another student's post in way that demonstrates thoughtfulness.	5.0 pts

Total Points: 10.0

Recap: Searle's Chinese room

Searle imagines himself alone in a room following a program for responding to Chinese characters slipped under the door. By following the program for manipulating symbols just as a computer does, he sends appropriate strings of Chinese characters back out under the door, and this leads those outside to mistakenly suppose there is a Chinese speaker in the room.

Recap: Searle's argument

- Set-up:
  - ***Strong AI***: computers really play chess *intelligently* and *understand* language.
  - ***Weak AI***: computers are merely useful in psychology, linguistics, and other areas, in part because they can simulate mental abilities.
  - ***L***: a natural language,
  - ***Program for L:*** a program for conversing fluently in L.
  - ***A computing system***: any system that can run a program.

- Argument:

  (1) If Strong AI is true, then there is a program for Chinese such that if any computing system runs that program, that system thereby comes to understand Chinese.

  (2) I could run a program for Chinese without thereby coming to understand Chinese.

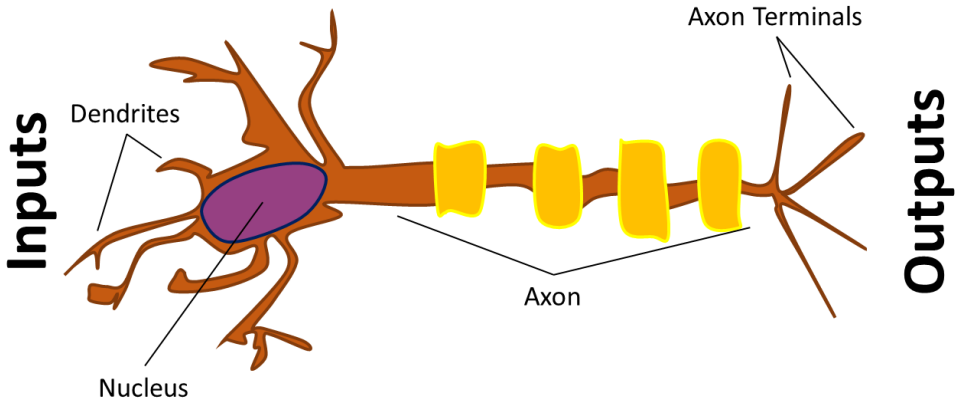
  (3) Therefore, Strong AI is false.

Replies to the Chinese room argument

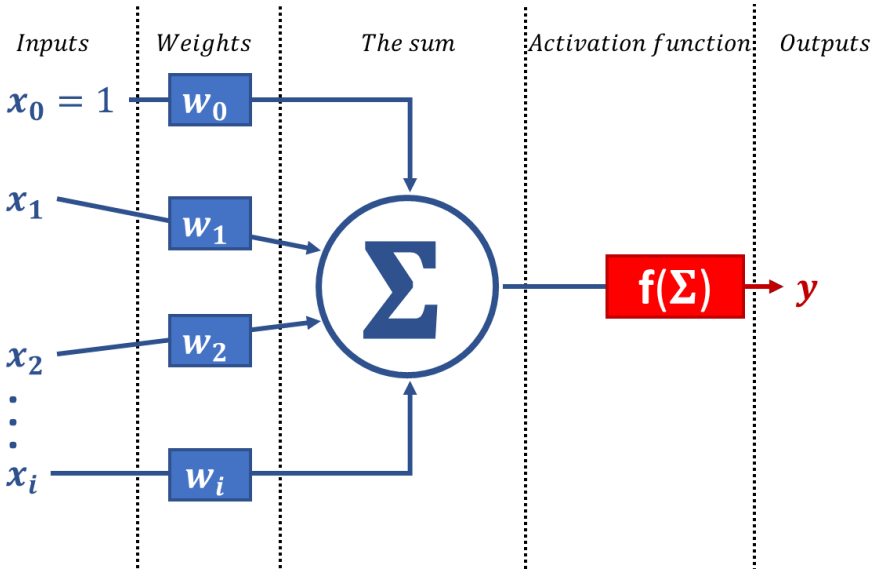
- The Systems Reply
  - While the person running the program does not understand, the system as a whole does.
    - **Searle**: rerun the argument after internalizing the whole system.
- The Robot Reply
  - The system will understand Chinese if it learns and uses it in an environment.
    - **Searle**: this is just more input for the person to deal with, with zero increase in understanding.
- The Brain Simulator Reply
  - Let the program be an artificial brain created by uploading the mind of a Chinese speaker.
    - **Searle**: let the artificial brain work via a huge set of valves and water pipes in the room. Still no understanding!
- The Other Minds Reply
  - The system passes all tests we would use to test whether other minds understand Chinese.
    - **Searle**: the argument shows that those tests are insufficient! Understanding goes beyond behavior and requires *conscious intentionality*.
- The Intuition Reply
  - The argument is based on untutored intuition, which is not a reliable source for knowledge.

The details of gradual uploading

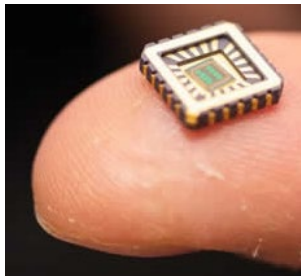
- Step 1: identify mind-relevant functions of neurons.



- Step 2: create a *substrate independent model* of those functions.

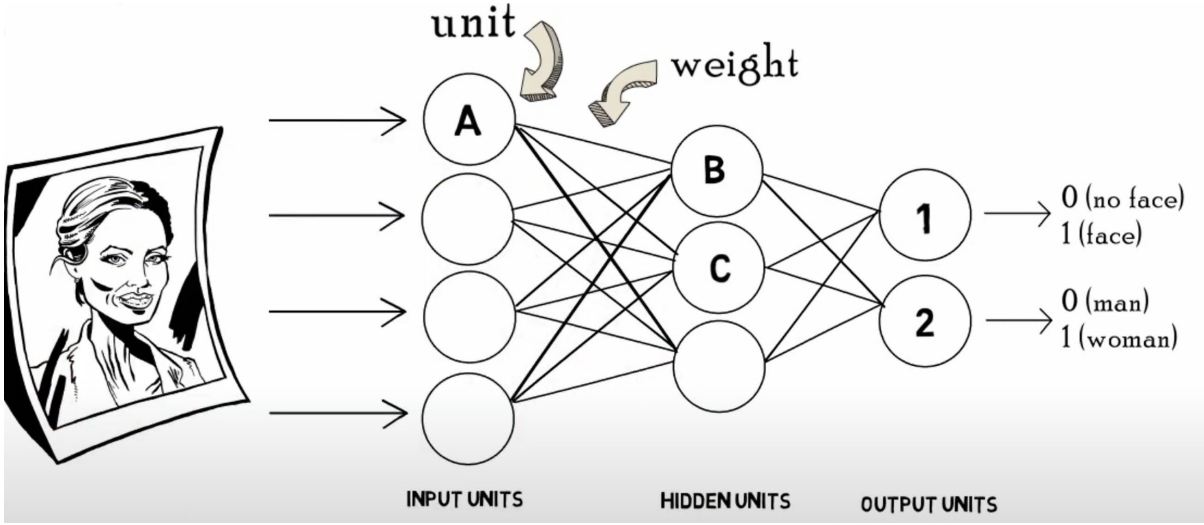


- Step 3: implement the model on a non-biological substrate.

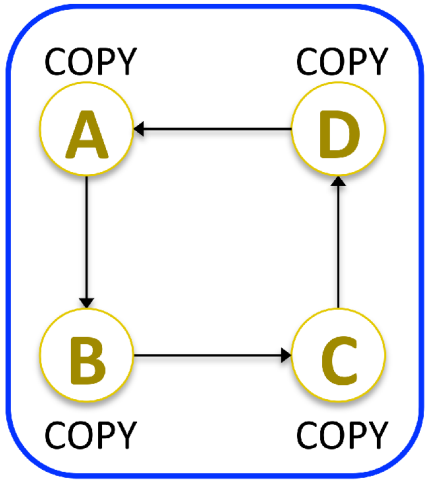


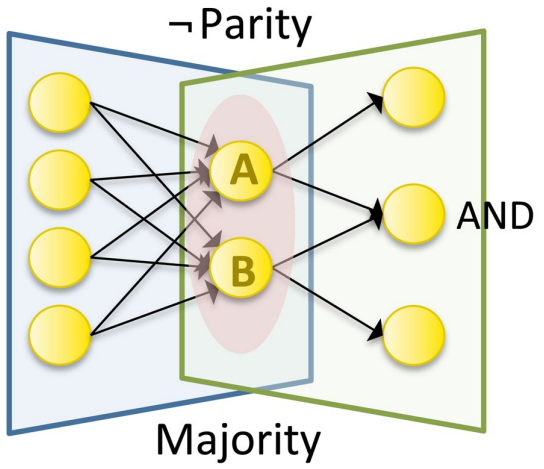
Steps 1&2: mind-relevant functions

- Cognition (leading to intelligent behavior)
  - Facial recognition systems (for e.g.) are based on artificial neural networks.



- Consciousness
  - A leading theory of consciousness (integrated information theory) states that *feedback networks* or networks with *overlapping inputs and outputs*, are necessary and sufficient for consciousness.





ARTICLE

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Optimal solid state neurons

Kamal Abu-Hassan[1], Joseph D. Taylor[1], Paul G. Morris[1,2], Elisa Donati[3], Zuner A. Giacomo Indiveri[3], Julian F.R. Paton[2,4] & Alain Nogaret[1*]

Bioelectronic medicine is driving the need for neuromorphic microcircuits that integrate raw nervous stimuli and respond identically to biological neurons. However, designing such circuits remains a challenge. Here we estimate the parameters of highly nonlinear conductance models and derive the ab initio equations of intracellular currents and membrane voltages embodied in analog solid-state electronics. By configuring individual ion channels of solid-state neurons with parameters estimated from large-scale assimilation of electrophysiological recordings, we successfully transfer the complete dynamics of hippocampal and respiratory neurons in silico. The solid-state neurons are found to respond nearly identically to biological neurons under stimulation by a wide range of current injection protocols. The optimization of nonlinear models demonstrates a powerful method for programming analog electronic circuits. This approach offers a route for repairing diseased biocircuits and emulating their function with biomedical implants that can adapt to biofeedback.

Breakout rooms

- What is the strongest reply to the Chinese room argument and why?