UGEB 2008: Mind, Brain and AI
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2020-21 2nd Term

I. Course Description

This course introduces the fundamentals and contemporary developments of artificial intelligence (AI) as well as brain research and discusses the philosophical issues arising from these rapidly developing research fields. Topics include major approaches of AI, the Turing test, Searle and Dreyfus' critique of AI; fundamentals of neuroscience, techniques of brain imaging, the mapping of brain functions; the mind-brain relation, philosophical theories of mind and the nature of mental phenomena like consciousness and free will. The aim is to help students to reflect on the potentials and limits of AI and brain research and to achieve a deeper understanding of ourselves as human beings.

II. Course Outline

1. **AI**
   a. History and Fundamentals of AI
   b. The Turing Test and its Criticisms
   c. The Chinese Room Argument and its Criticisms
   d. Structure and Limitations of Computers
   e. Dreyfus' Criticisms of (Traditional) AI
   f. Connectionism and Neural Networks
2. **Brain**
   a. Computer vs. Human Brain
   b. Emotion and Rationality
   c. Neuron
   d. Structure of Human Brain
   e. Brain Lesions
   f. Techniques of Brain Imaging
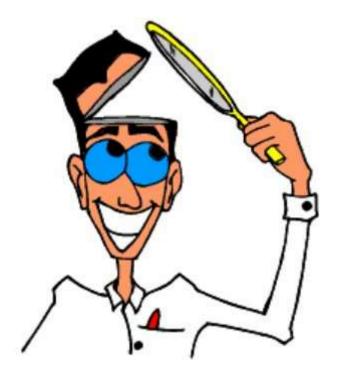3. **Mind**
   a. Traditional Conception: "Ghost in the Machine"
   b. Free Will
   c. Dualistic Theories: Interactionism, Parallelism, Occasionalism, Epiphenomenalism
   d. Contemporary Theories: Behaviorism, Identity Theory, Functionalism, Property Dualism
   e. Consciousness
4. **Concluding Discussions**

III. Schedule and Readings

1. Week: Introduction and AI. Readings: Copeland, ch. 1.
2. Week: AI. Readings: Copeland, ch. 2-3.
3. Week: AI. Readings: Copeland, ch. 3 & 6.
4. Week: AI. Readings: Copeland, ch. 4 & 5.
5. Week: Brain. Readings: Churchland, ch. 3-4.
6. Week: Brain. Readings: Damasio.
7. Week: Brain. Readings: Churchland, Ch. 4-5.
8. Week: Brain. Readings: Copeland, ch. 9.

9. Week: Mind. Readings: Heil, ch. 1-2.
10. Week: Mind. Readings: Heil, ch. 3-4.
11. Week: Mind. Readings: Heil, ch. 5-7.
12. Week: Mind. Readings: Heil, ch. 13.
13. Week: Conclusion. Copeland, ch. 10.

IV. Learning Outcomes

1. Recognize the latest developments of computer technology and brain research.
2. Identify and discuss the central issues of the philosophy of AI and mind.
3. Critically analyze problems arising in our technological age.

V. Assessment Method

1. Final Exam: 70%
2. Group Project and Class Presentation: 30%*

- Students are required to undertake a group project and present their results in class. Topics include New Technology in AI, Brain Research, Problem of Free Will, Psychological Research and Science Fiction.

- Grade descriptors: http://phil.arts.cuhk.edu.hk/~phidept/UG/Grade_descriptors.pdf

VI. References

- **Basic Readings:**

1. Copeland, Jack, *Artificial Intelligence: A Philosophical Introduction*, Cambridge, Mass.: Blackwell, 1993.
2. Heil, John, *Philosophy of Mind: A Contemporary Introduction*, 2nd ed., New York: Routledge, 2004.
3. *Brain Story: What do we think and feel as we do?* (DVD), BBC, 2004.

- **Supplementary Readings:**

1. Bechtel, William et al. (ed.), *Philosophy and the Neurosciences: A reader*, Oxford: Blackwell, 2001.
2. Boden, Margaret A. (ed.), *The Philosophy of Artificial Intelligence* (Oxford Readings in Philosophy), Oxford: Oxford UP, 1990.（中譯本：《人工智能哲學》，譯者劉西瑞、王漢琦；上海：上海譯文出版社，2001。）
3. Chalmers, David J., *The Conscious Mind: In Search of a Fundamental Theory*, New York: Oxford UP, 1996.
4. Churchland, Patricia Smith, *Neurophilosophy: Toward a Unified Science of the Mind-Brain*, Cambridge, Mass.: MIT Press, 1986.
5. Clark, Andy, *Being There: Putting Brain, Body and World Together Again*, Cambridge, Mass.: MIT Press, 1997.
6. Damasio, Antonio R., *Descartes' Error: Emotion, Reason and the Human Brain*, New York: Avon, 1998.
7. Dreyfus, Hubert L., *What Computers Still Can't Do: A Critique of Artificial Reason*, Cambridge, Mass.: MIT Press, 1993.（本書第一版之中譯本：《計算機不能作什麼：人工智能的極限》，譯者寧春嚴；北京：三聯書店，1984。）
8. Hofstadter, Douglas R., *Gödel, Escher, Bach: An Eternal Golden Braid*, Hassocks: Harvester, 1979.（中譯本：《一條永恒的金帶》，譯者東秀成；成都：四川人民出版社，1984。）
9. Kim, Jaegwon, *Philosophy of Mind*, Boulder: Westview Press, 1996.
10. Moravec, Hans P., *Mind Children: The Future of Robot and Human Intelligence*, Cambridge, Mass.: Harvard UP, 1988.

11. Popper, Karl R./John C. Eccles, *The Self and Its Brain: An Argument for Interactionism*, Berlin: Springer, 1977.
12. Sacks, Oliver, *The Man Who Mistook His Wife For A Hat: And Other Clinical Tales*, New York: Touchstone Books, 1998.
13. Searle, John R., *Minds, Brains and Science*, Cambridge, Mass.: Harvard UP, 1984.（中譯本：《心腦與科學》，譯者楊音萊；上海：上海譯文出版社，1991。）
14. —, *The Rediscovery of the Mind*, Cambridge, Mass.: MIT Press, 1992.
15. 陳叔瑄：《思維工程：人腦的智能活動和思模型》；福州：福建教育出版社，1994。

VII. Academic Honesty and Plagiarism

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at http://www.cuhk.edu.hk/policy/academichonesty/.

With each assignment, students will be required to submit a signed declaration that they are aware of these policies, regulations, guidelines and procedures. For group projects, all students of the same group should be asked to sign the declaration.

For assignments in the form of a computer-generated document that is principally text-based and submitted via VeriGuide, the statement, in the form of a receipt, will be issued by the system upon students' uploading of the soft copy of the assignment. Assignments without the receipt will not be graded by teachers. Only the final version of the assignment should be submitted via VeriGuide.