UGEB 2008 Mind, Brain and AI

1. Course Information

- Lecturer: Dr. Chan Kin Lok
  - Email: kinlok.chan@gmail.com
  - Phone:
- Classroom: ERB 803
- Lecture: Friday 13:30-15:15
- Tutorial: Friday 15:30-16:15

2. 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.

3. Outline

I. AI

- Structure of Computers
- History & Fundamentals of AI
- Symbolism vs. Connectionism
- Neural Networks & Machine Learning
- Supervised & Unsupervised Learning
- The Turing Test and its Criticisms
- The Chinese Room Argument and its Criticisms

II. Brain

- Neuron
- Structure of Human Brain
- Computer vs. Human Brain
- Brain Lesions
- Techniques of Brain Imaging
- Emotion and Rationality

III. Mind

- Traditional Conception: "Ghost in the Machine"
- Free Will
- Dualistic Theories
  - Interactionism, Parallelism, Occasionalism, Epiphenomenalism

- Contemporary Theories
    - Behaviorism, Identity Theory, Functionalism, Property Dualism
- Consciousness & Hard problem of consciousness

4. Learning Outcomes

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

5. Assessment Method

Final Exam: 70%
Group Project and Class Presentation: 25%
Class Performance: 5%

6. References

Basic Readings:

- Russell, S. J., & Norvig, P. (2016). *Artificial intelligence: a modern approach*. Pearson Education Limited.
- Carter, M. (2007). *Minds and Computers: An Introduction to the Philosophy of Artificial Intelligence*. Edinburgh University Press.
- Heil, J. (2012). *Philosophy of mind: A contemporary introduction.* Routledge.
- O'Shea, M. (2005). *The brain: a very short introduction*. OUP Oxford.
- Farinella, M., & Roš, H. (2013). *Neurocomic*. Nobrow Press.

Supplementary Readings:

- Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT press.
- Kim, J. (2018). *Philosophy of mind*. Routledge.
- Purves, D. E., Augustine, G. J., Fitzpatrick, D. E., Hall, W. C., LaMantia, A. S. E., McNamara, J. O., & White, L. E. (2018). *Neuroscience*. Sinauer associates.

7. 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.

8. Generic grade descriptors

This is the link to the generic grade descriptors:
http://phil.arts.cuhk.edu.hk/~phidept/UG/Grade_descriptors.pdf