PHIL3263
Philosophical Problems and Computational Tools 哲學問題與計算工具

Course Outline

Time: Tuesday 10:30am-1:15pm	Location: LHC G03

Course overview (as shown on CUSIS)

In this digital age, philosophical inquiries can benefit from embracing powerful computational tools in their methodology. This course is an introduction to the use of computational tools in the investigation of philosophical problems and will focus on some prominent examples of leveraging computation tools in addressing philosophically significant issues. These examples may include (but are not limited to)

- tools for data analysis in general (such as JASP) and corpus analysis in particular (such as Voyant), in connection with inquiries in the history of philosophy and in experimental philosophy
- tools for agent-based modelling (such as NetLogo), in connection with inquiries in social epistemology and in moral and political philosophy
- tools for probabilistic and causal modelling (such as Tetrad), in connection with inquiries in Bayesian epistemology and in general philosophy of science
- tools for virtual reality (such as A-Frame), in connection with inquiries in traditional metaphysics and epistemology.

Specific tools to be introduced in this course and related philosophical topics to be discussed are likely to vary from semester to semester, but the core purpose of the course remains the same: to expose students to various ways computational tools can help with philosophical investigations and to give them hands-on experience in using the tools to address philosophically motivated problems. In addition to exploring the power of computational methods, this course will also help students understand their limitations.

Advisory to Majors: to be taken in year 2 or above.

Learning outcomes (as shown on CUSIS)

1. Identify and explain various ways philosophical inquiries can be enhanced by computational methods.
2. Grasp and reproduce a prominent example of using computational tools in philosophical research.
3. Demonstrate proficiency in using selected computational tools.
4. Develop the ability to design and carry out a small-scale project with the aid of computational tools.
5. Develop critical reflection about the benefits and limitations of computational methods.

Topics

1. Basic data analysis and visualization techniques with applications in experimental philosophy and textual analysis
2. Probabilistic and causal modelling in philosophy of science
3. Agent-based modelling in social epistemology
4. Agent-based modelling in moral and political philosophy
5. Automated theorem proving and countermodel search with applications to arguments in metaphysics
6. Virtuality reality and skepticism
7. Reflections on computational methods and use of AI in philosophy

Learning activities

1. Interactive lectures
2. Tutorial presentations and discussions
3. Lab sessions
4. Group projects

Assessment scheme as prescribed on CUSIS (revise if necessary)

Task nature	***Description***	***Weight***
Participation	Participation in tutorials/lab sessions	20%
Reports	Two reports on replication of computational results	30%
Presentation	One group project presentation	15%
Final Essay	One essay with philosophical and computational components	35%

Grade Descriptor

Please refer to: http://phil.arts.cuhk.edu.hk/~phidept/UG/Grade_descriptors.pdf

Course schedule

Week	***Topics***	***Required reading***	***Tutorials***
1 (Jan 6)	Overview	Grim and Singer (2024)	Data analysis and visualization 1
2 (Jan 13)	Experimental philosophy and textual analysis	Knobe and Malle (1997) Alfano (2018)	Data analysis and visualization 2
3-4 (Jan 20 & 27)	Probabilistic and causal modelling	Charniak (1991) Wheeler and Scheines (2013)	Jan 20: Lab session on Tetrad Jan 27: Discussion: How tetrad can help with philosophical work
5-6 (Feb 3 & 10)	Agent modelling in philosophy of science	Kitcher (1990) Zollman (2007) Grim et al. (2013)	Feb 3: Lab session on NetLogo Feb 10: Discussion: The relevance of simulation studies
7 (Feb 17)	Lunar new year		
8 (Feb 24)	Automated theorem prover and metaphysics	Oppenheimer and Zalta (2011)	Lab session on Prover9/Mace4
9 (Mar 3)	Reading week		
10-11 (Mar 10 & 17)	Epistemic democracy and simulation studies	Anderson (2006) Hong and Page (2004) Grim et al. (2019)	Mar 10: Discussion: Empirical studies for (social) epistemology Mar 17: Lab session on robustness check
12 (Mar 24)	Game theory and replicator dynamics	Axelrod and Hamilton (1981) Vanderschraaf (2006)	Presentations
13 (Mar 31)	Virtual reality	Chalmers (2023), selected chapters	Presentations
14 (Apr 7)	Easter		
15 (Apr 14)	Course review		Presentations

Readings:

Alfano, M. (2018). Digital Humanities for History of Philosophy: A Case Study on Nietzsche. In levenberg, l., Neilson, & T., Rheams, D. (eds.) *Research Methods for the Digital Humanities*, pp. 85-101. Palgrave Macmillan.

Anderson, E. (2006). The Epistemology of Democracy. *Episteme*, 3: 8-22.

Axelrod, R., and Hamilton, W. D. (1981). The Evolution of Cooperation. *Science*, 211(4489): 1390–1396.

Chalmers, C. (2023). *Reality+: Virtual Worlds and the Problems of Philosophy*. Penguin.

Charniak (1991). Bayesian Networks without Tears. *AI Magazine*, *12*(4), 50. https://doi.org/10.1609/aimag.v12i4.918.

Grim, P., and Singer, D. J. (2024). Computational Philosophy. *Stanford Encyclopedia of Philosophy*. https://plato.stanford.edu/entries/computational-philosophy/.

Grim, P., Singer, D. J., Fisher, S., et al. (2013). Scientific Networks on Data Landscapes: Question Difficulty, Epistemic Success, and Convergence. *Episteme*, 10(4): 441–464.

Grim, P., Singer, D. J., Bramson, A., et al. (2019). Diversity, Ability, and Expertise in Epistemic Communities. *Philosophy of Science*, 86(1): 98–123.

Hong, L. and Page, S. E. (2004). Groups of Diverse Problem Solvers Can Outperform Groups of High-Ability Problem Solvers. *Proceedings of the National Academy of Sciences*, 101(46): 16385–16389.

Kitcher, P. (1990). The Division of Cognitive Labor. *The Journal of Philosophy*, 87(1): 5-22.

Knobe, J., and Malle, B. (1997). The Folk Concept of Intentionality. *Journal of Experimental Social Psychology*, 33: 101-121.

Oppenheimer, P. E., and Zalta, E. N. (2011). A Computationally-Discovered Simplification of the Ontological Argument. *Australasian Journal of Philosophy*, 89(2): 333–349.

Vanderschraaf, P. (2006). War or Peace?: A Dynamical Analysis of Anarchy. *Economics and Philosophy*, 22(2): 243–279.

Wheeler, G., and Scheines, R. (2013) Coherence and Confirmation through Causation. *Mind*, 122(485): 135-170.

Zollman, K. (2007). The Communication Structure of Epistemic Communities. *Philosophy of Science*, 74(5), 574-587.

Additional readings:

Alexander, J. M. (2007). *The Structural Evolution of Morality*. Cambridge: Cambridge University Press.

Chartrand, L. (2022). Modeling and Corpus Methods in Experimental Philosophy. *Philosophy Compass*, 17(6).

Dorst, K. (2023). Rational Polarization. *Philosophical Review*, 132(3): 355-458.

Glymour, C., and Wimberley, F. (2007). Actual Causes and Thought Experiments. In J. K. Campbell, M. O'Rourke, & H. Silverstein (eds.) *Causation and Explanation*, pp. 4-43. Bradford.

Pence, C. H., and Ramsey, G. (2018). How to Do Digital Philosophy of Science? *Philosophy of Science*, 85(5): 930-941.

Scheller, S., Merdes, C., and Hartmann, S. (2022). *Computational Modelling in Philosophy*. Synthese Topical Collection.

Zhai, P. (1998). *Get Real: A Philosophical Adventure in Virtual Reality*. Rowman & Littlefield.

J. Zhang (2013). A Comparison of Three Occam's Razors for Markovian Causal Models. *British Journal for the Philosophy of Science*, 64(2): 423-448.

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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.