

SYLLABUS

PSYC420: PERCEPTION, INFERENCE, INTELLIGENCE --- WINTER 2016

COURSE OBJECTIVES

What can we know about the world around us? What can we know about ourselves? What is intelligence? Can animals or plants be intelligent? How about machines? Can intelligence be designed from scratch or does it have to be learned? What role does the sensing and acting body play in the establishment of intelligence? We will adopt a synthetic approach to these deep philosophical questions by looking into what artificial intelligence and robotics have to say about them. The discussion will be centered around a book written by two Roboticians who summarize the state of the art of the field of Embodied Cognition.

CONTACT INFORMATION

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TEXTBOOK

Rolf Pfeifer and Josh Bongard, How the Body Shapes the Way we Think? (MIT Press, 2007)

The campus bookstore has the book in stock. Everyone in class should own a copy.

The book is not really a textbook. It is a monograph on the idea of Embodied Intelligence. It approaches the nature of intelligence from a viewpoint which is unusual for a Psychologist. It tries to come up with a definition of intelligence that does not require introspection and tries to abstract as much as possible from a human-specific viewpoint. I then attempts to formulate “design principles”: What are the ingredients that are required to generate intelligence – not just in humans, but in things in general. The authors argue that only things that can physically interact with their environment can develop intelligence.

We don't have to adopt the authors conclusions at the end. But we will use the text to discuss notions such as knowledge, free will, consciousness, and intelligence. We seem to know what these terms mean as we experience them introspectively. But we now want to adopt the viewpoint of an alien who approaches any agent with the same unprejudiced naivety – be it humans, other animals, or machines.

FORMAT

We will cover the book chapter by chapter. Everybody should read it. Each week, two **Presenters** are responsible for a seminar talk and a following discussion. They will be assisted by two **Readers**, who each provide a “reading response paper”, and the rest of the class, the **Commenters**, who provide additional thoughts. Every student serves at least once as Presenter, once as Reader and the rest of the time as Commenter.

READING RESPONSE PAPER

Readers will read the chapter carefully and post a “reading response paper” 48 hours before class (*deadline Mondays at 3:30 pm*). Both readers do that independently from each other. The paper should be no longer than 2000 words. The paper should start with a short summary and then move onto a more specific topic of your choice. Examples are:

- Connect the chapter to more recent work. The book is almost 10 years old and the field develops quickly. You might have done some research and have come across a blog, a gadget, a thought. Maybe you even studied an original research paper, that connects to the assigned chapter.
- You might have looked up some of the studies referenced in the chapter. Some of the classic work is fun to read. If required, I am happy to provide assistance in picking something interesting.
- Emphasize what you found interesting: You discover a new and interesting idea in the text that makes you thinking. It might be a convincing idea or it might be a puzzling one. Point it out to the rest of the class and explain why you consider it important.
- Critique: You think you understand what the authors want to say, but you think that there is a flaw in the logic of their argument. You are not in accordance with their conclusions and you specify why that is the case.
- Assistance required: You do not understand a particular point the authors want to make. You tried to look up missing terms, but you still feel you are missing out on something essential. In that case, please provide details on what exactly you are not understanding and about your attempts to resolve the issue

Be aware that the paper has multiple functions:

- It should help the class to digest the contents of the chapter.
- It should help the Presenters by providing them with new ideas and viewpoints for in-class presentation and discussion.
- It is also a target for the comments from the rest of the class.

COMMENTS

The Reading Response Papers will be posted as on a threaded discussion forum on our Moodle page 48 hours before class. Over the next 24 hours, everybody in class with the exception of the Presenters and Readers has to make one comment in reference to one of the two papers. The comment shouldn't be longer than 250 words. Pick one of the following formats:

- Clarification request. You claim X, but I cannot figure out what exactly you mean by that. Do you mean by this X1 or X2?
- Argument request. You claim X. I think I know what you mean. But why do you claim X? I don't see any argument for it, and I think you need to give an argument for it.
- Objection. You claim X. However, I think that that claim is problematic. Here's my objection to X.
- Assistance. You claim X. I agree with you, but I think the following additional reason (which you do not mention) can be given in support of X.
- Competing interpretation. You interpret the reading as X. However, I don't think that this is exactly what it says. Instead, I think it says Y (and here's why I think this).
- Suggestion of parallels. You claim X which reminds me of so-and-so's point Y. Are the two really similar? Does comparing X to Y help illuminate X, or is it just misleading?

PRESENTATION AND DISCUSSION

The presentation should be timed such that both the presentation itself and the subsequent discussion fit well into the weekly 2-hour time slot. The Presenters should plan for a 45 min presentation, then a short break (say 5 min) and then lead another 30+ min discussion. The Presenters have to work together on the preparation of both the presentation itself and the subsequent discussion. It is up to them how they divide the preparatory work and break down their roles

in class. It seems to make sense, though, that one person delivers the presentation and the other person organizes and manages the discussion.

The presentation should consist of two parts: A comprehensive summary of the chapter and a reflexion on its contents. The discussion requires careful preparation, too, and should address the Reading Response Papers and the Comments:

Summary of the contents

- What is the motivating question of the chapter?
- What is its main take home message?
- What are the main concepts and terms that we need to understand?
- What is the chapter's role in the larger context of the book?

Your own take

- Is there anything that did not seem to make sense to you?
- Is there anything that you found particularly surprising, eye-opening, or otherwise worth to mention?
- What did the chapter contribute to your understanding of “intelligence”?

Discussion

- Prepare a number of questions to start and then guide the discussion.
- Involve the Readers in the discussion by commenting on their paper and asking them questions.
- Use the replies and comments of the Commenters. Feel free to address particular students about their particular replies, questions, and comments.

FINAL EXAMINATION

The final exam will consist of a number of general questions that will be answered in essay form. Duration of the exam will be an hour.

EVALUATION

Reading Response Paper (25%): The quality of the Reading Response Paper will be graded both in term of your understanding of the chapter and the quality, creativity, and scholarship of your contributions to it.

Comments and contribution to Discussion (25%): Both the quality of your comments and your contributions to the discussion go into this mark.

Presentation & Discussion (25%)

Final Exam (25%)

Additional Bonus Marks at my discretion (e.g. you find this new, cool research paper and summarize it during in-class discussion)! **Subtraction** of 1% for each missed class.

The different assignments will be marked using numerical percentage marks. The final course average will then be converted to a final letter grade according to Queen’s Official Grade Conversion Scale:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
≥ 90	85-89	80-84	77-79	73-76	70-72	67-69	63-66	60-62	57-59	53-56	50-52	≤ 49

MISSED OR LATE ASSIGNMENTS

The format of the course requires you to submit assignment according to schedule. The other students in class rely on your timely contributions. In general, work that is not handed in on time will receive a mark of zero.

Things happen, though. Please see the instructor AS SOON AS POSSIBLE if you are unable to complete work so that we can talk about it. If you bring valid documentation from a health professional, funeral home, coach of sports team, etc. we can add the percentage of a missed assignment to the remaining ones.

REQUEST FOR ACADEMIC ACCOMMODATION

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Wellness Services (SWS) and register as early as possible. For more information, including important deadlines, please visit the Student Wellness website at: <http://www.queensu.ca/studentwellness/accessibility-services/>

LOCATION AND TIMING OF FINAL EXAMINATIONS

As noted in Academic Regulation 8.2.1, "the final examination in any class offered in a term or session (including Summer Term) must be written on the campus on which it was taken, at the end of the appropriate term or session at the time scheduled by the Examinations Office."

The exam period is listed in the key dates prior to the start of the academic year in the Faculty of Arts and Science Academic Calendar and on the Office of the University Registrar's webpage. A detailed exam schedule for the Winter Term is posted the Friday before Reading Week. Students should delay finalizing any travel plans until after the examination schedule has been posted. Exams will not be moved or deferred to accommodate employment, travel/holiday plans or flight reservations.

ACADEMIC INTEGRITY

Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see <http://www.academicintegrity.org>). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities at <http://www.queensu.ca/secretariat/policies/senateandtrustees/principlespriorities.html>).

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1 <http://www.queensu.ca/artsci/academic-calendars/2011-2012-calendar/academic-regulations/regulation-1>), on the Arts and Science website (see <http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity>), and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

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