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Course on *Logic and Machine Learning*, Semester 1, 2020

I am offering a course in *Logic and Machine Learning* in Semester 1 of 2020. Please send me an email (sasha.rubin@sydney.edu.au) if you are interested in participating.

Topic: After a crash-course in mathematical logic and machine learning, we will focus on understanding foundational and recent results at the intersection of logic and learning. Topics of interest include: how to get machines to learn symbolic objects like formulas, instead of numeric parameters; how to get machines to learn from symbolic objects, e.g., reinforcement learning with logical objectives; how to speed up learning with domain-specific knowledge in symbolic form; how to verify neural networks.

This topic appears in conferences such as AAAI, IJCAI, ICAPS, KR, as well as a handful of fairly new workshops:

- Learning and Automata
  (https://learnaut19.github.io/)
- Knowledge Representation & Reasoning Meets Machine Learning
  (https://kr2ml.github.io/)
- Declarative Learning Based Programming
  (http://delbp.github.io/)
- Reasoning about Actions and Processes: Highlights of Recent Advances
  (https://icaps19.icaps-conference.org/workshops/Actions/)
- Formal Methods and AI
  (https://project.inria.fr/fmai2019/)

Format: I will run this like a seminar course, where participants will give 1 hour seminars on foundational or recently published research papers. A list of papers will be suggested, but you are more than welcome to make your own proposal.

Participants: This course would suit students with a healthy appetite for research-level questions and mathematics (theorems/proofs). You might find this topic interesting if:

1. you enjoyed a course with a logic component, e.g., COMP 2022 or COMP 2922 or MATH3066 or PHIL1012 or PHIL2615, but were wondering what this has to do with AI.
2. you enjoyed a course in machine learning, e.g., COMP 3308, COMP 5318, COMP 5328, but were wondering what this has to do with symbolic approaches to AI.