

Editorial Introduction to the Special Articles in the Summer Issue

Artificial Intelligence Education

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■ *This issue of AI Magazine includes five articles that cover subjects of current concern to the AI education community. This editorial introduces those five articles.*

For the last several years, AAAI has organized the annual symposium on Educational Advances in AI, colocated with the annual AAAI conference. Other conferences, such as FLAIRS, have organized AI education tracks in the past. Additional landmark events in the past 20 or so years that looked at the challenges of AI education have included the AI Education Workshop held at the 2008 AAAI conference and the Improving Instruction of Introductory Artificial Intelligence symposium held at the 1994 AAAI Fall Symposium.

To quote Marti Hearst, the organizer of the 1994 symposium (Hearst 1994): “This symposium was motivated by the desire to address an oft-voiced complaint that introductory artificial intelligence is a notoriously difficult course to teach well.” With the regular progression of the field and recent successes such as autonomous cars, deep learning, and IBM’s Watson system, this situation has not become easier. At the same time, recent innovations in pedagogical technologies, such as massive open online courses (MOOCs), smartphones, and smart classrooms, have revolutionized how we view the art of teaching. We believe that now is a good time to take stock of state-of-the-art practices in the teaching of AI, as well as propose a vision for AI education in the future.

This issue of *AI Magazine* includes five articles at the cutting edge of AI education. Each covers a subject of current concern to the AI education community. We note that the subject area expertise of the authors covers a wide range including robotics, knowledge-based systems, ethics, machine learning, and game theory.

The article Ask Me Anything About MOOCs by Douglas Fisher, Charles Isbell, and Michael Littman was a unique project. The editors crowdsourced 10 questions about MOOCs from the recipients of the AAAI and SIGCSE mailing lists. The questions were then posed to authors Fisher, Isbell, and Littman — educators who have unique, relevant experiences to lend their perspective on those issues.

In Teaching Integrated AI Through Interdisciplinary Project-Driven Courses, Eric Eaton presents his work on an advanced robotics course that takes an interdisciplinary project-driven approach toward teaching AI. Interdisciplinary courses and project-based learning are on the rise at the K–12 level (Zubrzyck 2016) and a recent survey of AI practitioners (Wollowski et al. 2016) found that 41 percent of the respondents suggest systems engineering as a learning outcome. Eaton’s course fits this mold by providing for challenging problems that require the integration of multiple AI methods.

The article Ethical Considerations in Artificial Intelligence Courses by Emanuelle Burton, Judy Goldsmith, Sven Koenig, Benjamin Kuipers, Nicholas Mattei, and Toby Walsh is concerned with providing students learning opportunities about ethical theories — something that recently came to the forefront of public attention though remarks by high-profile entrepreneurs and prominent AI researchers through efforts such as the Future of Life Institute,¹ the Allen Institute for Artificial Intelligence,² and the recent Partnership on AI.³ The authors are interested in challenging students to probe their own ethical perspectives and make them explicit. In the context of an AI course, students investigate how their ethical theories may inform the design of intelligent systems. The authors hold that as educators, we have a responsibility to train students to recognize the larger ethical issues and responsibilities that their work as technologists may encounter.

Keeping It Real: Using Real-World Problems to Teach AI to Diverse Audiences by Nicole Sintov, Debarun Kar, Thanh Nguyen, Fei Fang, Kevin Hoffman, Arnaud Lyet, and Milind Tambe is an exemplar of using projects from the real world to introduce AI to diverse audiences inside and outside of academe. This article is in keeping with a recent survey of current practice and teaching of AI (Wollowski et al. 2016), which found a desire for exposing students to solving real-world problems. This article too provides a fine example of how to broaden AI expertise, a goal stated in the *Artificial Intelligence and Life in 2030* report (Stone et al. 2016).

Finally, in Using AI to Teach AI: Lessons from an Online AI Class, Ashok Goel and David Joyner describe details of the very successful online version of their course on knowledge-based AI. A key challenge that they address is how to keep students engaged in online courses. Goel and Joyner explain how they were able to rise to this challenge. They supplement traditional forms of communication with an innovative use of intelligent tutoring agents and video lessons. The online version of their course facilitates a unique and promising way in which students develop a learning community. An additional benefit is that their online version is effective in extending the AI classroom experience to nontraditional students. This article is also an exemplar of how to broaden AI expertise.

Notes

1. futureoflife.org.
2. allenai.org.
3. www.partnershiponai.org.

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- Todd W. Neller** is a professor of computer science at Gettysburg College. A Cornell University Merrill presidential scholar, he received a B.S. in computer science with distinction in 1993. In 2000, he received his Ph.D. with distinction in teaching at Stanford University, where he was awarded a Stanford University Lieberman Fellowship, and the George E. Forsythe Memorial Award for excellence in teaching. A game enthusiast, Neller has in recent years enjoyed pursuing game AI challenges, computing optimal play for jeopardy dice games and bluffing dice games, creating new reasoning algorithms, analyzing optimal risk attack and defense policies, and designing logic mazes.
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