Educational Advances in Artificial Intelligence

Laura E. Brown and David Kauchak

What do Pac-Man, Tsunamis, and Python all have in common? Educational Advances in Artificial Intelligence (EAAI)!

For those who haven't heard of it, EAAI is a symposium that is held in conjunction with AAAI. The symposium provides a venue for researchers and educators to discuss pedagogical issues and share resources related to AI and education.

This year, the symposium featured a range of activities, including two invited talks, paper presentations, poster presentations, panels, and workshops. Several main themes of discussion at the symposium included the introduction of AI concepts in early courses, active learning, and massive open online courses (MOOCs) and flipped classrooms.

With the emergence of "big data" as a buzzword in the mainstream media, new students are often interested in learning about this area but may not have the math or computing skills to support their interests. Paula Matuszek, in her invited talk at EAAI-13, introduced a collection of machine-learning modules for use in introductory computer science (CS) courses. The modules focus student understanding on the intuition and application of a machine-learning method (for example, decision trees or support vector machines) to a specific problem using supplied resources and tools (such as Weka or Orange) rather than on simply understanding the method's mathematical derivation. In addition to the invited talk, various papers and discussions at the symposium covered how other AI topics (search, game theory, logic, robotics, and others) could be used to serve as an introduction to CS and computation.

During the EAAI teaching and mentoring workshop, participants were introduced to the basic theory of active learning. Example active learning activities were described, then participants worked together to construct additional examples of methods that could be incorporated into an AI course. Ideas included approaches that increase student engagement (clickers, web polls, and physical enactment of decision boundaries, decision trees, or reinforcement learning), increase student reflection (pre-/postassessment minute papers, or lecture feedback on the clearest point and most confusing point), and increase student relevance and investment (use problems that are relevant to student interests or concerns). Other useful resources also emerged from the active learning discussion, including class icebreakers, ways to introduce particular topics, and strategies to accommodate varying student backgrounds.

With artificial intelligence and machine learning at the forefront of the MOOC initiative, many resources (lecture videos, assignments, projects, and others) have become available in these topic areas. EAAI presenters and participants discussed a range of approaches for leveraging these resources in the classroom and, more importantly, where these materials can be found. Participants also discussed challenges surrounding these resources including how to ensure proper attribution of content and how NSF might support these enterprises. In his invited talk, along with introducing some innovative project materials, Dan Klein discussed some of the challenges of moving to larger classes and, in particular, to online and split (combined online and in-person) classrooms. He emphasized that regardless of the lecture format, having engaging, well-structured projects is critical.

If any of these topics and discussions mentioned are of interest to you, please visit the EAAI site for additional materials, consider joining the AI and education mailing list, and become involved in EAAI next year.

Online Resources

EAAI Website: eaai.cs.mtu.edu

AI and education mailing list: lists.wkiri.com/listinfo.cgi/ai-ed-wkiri.com

Coursera: www.coursera.org

edX: www.edx.org

Udacity: www.udacity.com

MOOC provider list: www.moocs.co/Higher_Education_MOOCs.html

MOOC courselists: www.mooc-list.com

Bibliography

Berrett, D. 2012. How "Flipping" the Classroom Can Improve the Traditional Lecture. *The Chronicle of Higher Education* 59(23) (Feb. 19, 2012). chronicle.com/article/How-Flipping-the-Classroom/130857

Mazur, E. 2009. Farewell, Lecture? *Science* 323(5910): 50–51.