Emerging Technologies: Accelerants for Deep Learning

Education

Dr. Wayne Grant, Director of User Experience, Intel® Education

Dr. Grant serves as Director of User Experience, within the Intel® Education Group. Prior to joining Intel, Dr. Grant served as Chief Education Officer at PASCO Scientific where he set corporate vision and product direction for the application of technologies to science teaching and learning. Before joining PASCO, Dr. Grant was the President and founder of ImagiWorks, Inc., the first company to bring patented handheld solutions to the education market. Dr. Grant also served as a Principal Scientist at SRI International's Center for Technology in Learning. There he led R&D of distributed, multi-user environments designed to support teacher professional growth. Dr. Grant also spent eight years as a Senior Scientist with Apple Classrooms of Tomorrow (ACOT). While with ACOT, he studied the use of forward-thinking, purpose-built hardware and software prototypes and their application to teaching and learning. Dr. Grant received his Ph.D. from Stanford University in the Design and Evaluation of Educational Programs with a focus on Human Computer Interaction and his M.A. also from Stanford, in Interactive Educational Technology.

Rhonda Rosales, Learning Experience Definition Team Leader, Intel® Education

Rhonda leads the learning experience definition team for Intel® Education Solutions. She has a long background creating award-winning K-12 education solutions. Prior to Intel, Rhonda was at PASCO Scientific where she managed the definition of their flagship science application and associated K-8 content. Before PASCO, Rhonda co-founded ImagiWorks, where she defined math and science applications designed for mobile devices. Rhonda also managed K-12 products at Knowledge Revolution and was a researcher at SRI International's Center for Technology in Learning studying the use of technology for students and teachers in K-12 education. Rhonda has a degree in Symbolic Systems from Stanford University.

Eric Cooper, Senior Research Engineer, Intel

Eric has worked on a broad range of educational technology projects over the past 30 years: laserdisc-based courseware, intelligent tutoring systems, collaborative intentional learning systems, microworlds for geometry and algebra, iOS apps for math and science. At Intel, Eric explores emerging technologies and envisions how they could benefit learning experiences and outcomes. Prior to Intel he held engineering and research positions at DEC, BBN Labs, Apple, and Learning in Motion. Eric has a B.A. in Computer Science/Artificial Intelligence from Brandeis University, and M.A. in Education from Stanford University.

Emerging Technologies: Accelerants for "deep learning"

In addition to constructing core content knowledge, students preparing to live a fulfilling life in this century must develop a broad range of 21st century skills, and ultimately become self-directed learners—individuals who want to learn, who know how to learn strategically, and who, in their own highly individual and flexible ways, are well prepared for a lifetime of learning. This broader notion of learning that encompasses human flourishing is what we mean by "deep learning."

Yet learners differ in the ways they perceive and comprehend information, in the ways they navigate a learning environment and express what they know, and in the ways in which we as educators can engage and motivate them to learn. "The pace of development in technology and its application to learning are creating new possibilities to address such individual differences. Unless developed in school and for all, these technologies will simply be developed outside school and only for some" (2013, Sir Michael Barber, Chief Education Advisor, Pearson).

Accelerant technologies enable broader forms of content representation, create more interactive and engaging forms of exploration and knowledge construction, scaffold new forms of self-expression and ultimately deliver unprecedented levels of personalization. In this session, we will demonstrate several accelerant technologies and discuss their potential as energizers of pedagogical transformations focused on developing deep learning.

3D Gesture

3D gesture provides a rich physical mode of interaction that goes beyond keyboard, mouse, and touch. Gestures enable more natural navigation through three dimensional models and simulations. For some they will allow more full-body interaction, recognizing sweeping hand and arm gestures. For others, they could enable control of new and existing applications through head movements. Actions that require both hands and complex key-chords can now be done with a single hand, as it moves through 3D space creating a sequence of gestures.

Augmented Reality

Augmented reality applications add information and meaning to a real object or place by overlaying on those elements, computer-generated, contextual data that can help deepen a person's understanding of their situation in the following ways:

- By overlaying data, AR apps maintain focus on the phenomenon, preserving engagement.
- Because objects or places have history and a context, using AR to make that content available while individuals interact with those elements can provide a richer experience.
- To the extent that instructional designers can use AR to furnish students with a broader context for understanding the real world, students are more likely to comprehend and remember what they learn.

Speech Interaction

Speech, for many of us, is the most natural form of interaction—and promises to provide intuitive user interface for many different kinds of learners. While a learner with dyslexia may excel at story-telling in conversation, he may falter when telling that same story in writing. For all learners, as devices become smaller and more portable, reduced screen size will create barriers. Speech interfaces will be imperative.

We are working on ways to enhance basic command and control to accommodate young speakers, while also researching free-form automated speech recognition for things like dictation, pronunciation-coaching, and recitation practice.

Affective Computing

Affective computing could enable learning environments to recognize individual learners' expressions of excitement, frustration, and boredom. Adaptive learning environments will be able to use these inputs, along with others, to

- Adjust difficultly levels in delivered content
- Recognize patterns of student motivation
- Gauge emotional investment

We are looking at ways to use affect recognition to help personalize the learning experience.

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